



United States Department of Agriculture

Sweet-Ione Integrated Resources Improvement Project

Environmental Assessment



Forest Service Colville National Forest, Newport-Sullivan Lake RDs November 2021

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1.0 Location of the Proposed Project Area

The project area is approximately 20,435 acres, located within the Big Muddy Creek and Sweet Creek-Pend Oreille River (hereafter referred to as Sweet Creek) subwatersheds, of which approximately 18,865 acres are National Forest System (NFS) lands. The elevation of the area ranges from about 2,000 feet to 5,400 feet near Huckleberry Mountain. Primary access to the project area is from County Road 2705 (Cedar Creek), County Road 2714 (Smackout Pass), County Road 2695 (Meadow Lake), County Road 2625 (Hanks Butte), and State Highways 20 and 31. See Appendix A, Figure 1 for a map of the vicinity and project area.

1.1 Purpose and Need for the Proposal

The Sweet-Ione Integrated Resources Improvement Project proposed action is based on direction found within the Colville National Forest Land Management Plan (Forest Plan, 2019) as well as direction from the Pend Oreille County Community Wildfire Protection Plan (CWPP) (2005, as amended).

Purpose: Meet Forest Plan direction to create a range of forest structural stages that supports resilience¹ and is compatible with characteristic disturbance processes such as wildland fire, insects and diseases, and supports aquatic and terrestrial habitat conditions and their associated species (Forest Plan 2019 page 34).

Needs: A variety of needs were identified by comparing current ecological conditions to the desired conditions described in Chapter 2 in the Forest Plan (2019). A multi-faceted approach was developed to address the following needs:

- a need to trend vegetation types toward their historic range of variability
- a need to move fire regimes and fire regime condition classes toward their historical range of variability
- a need to move watershed conditions toward Properly Functioning
- a need to increase forage and habitat effectiveness for big game
- a need for supporting local economic viability, and
- a need for a sustainable road system supporting public and administrative access

The following objectives were developed to address the need for action and are based on desired conditions within the Forest Plan (2019):

1. Move forest stands toward their historical range of variability (HRV) for structure, patch size, and tree species composition (Forest Plan 2019 page 34, FW-DC-VEG-03);
2. Reduce the potential for high-severity wildfires in the wildland-urban interface areas, providing protection for communities and diversity within stands; emphasizing fuel treatments in wildland urban interface and areas that exhibit the potential for high-severity

¹ A resilient forest is, in general, one that can bounce back after being stressed from wildfire, insect or disease attacks, or both, and human stressors while maintaining complexity and natural processes.

fire behavior that could impact private or other agency lands; and establishing or maintaining a pattern of treatments that are effective in modifying fire behavior, as identified in individual community wildfire protection plans (Forest Plan 2019 pages 38-39, FW-DC-VEG-11, 13, and 14);

3. Improve watershed condition class by improving aquatic and riparian habitat conditions (e.g., support native aquatic and riparian dependent plant and animal species, distribution of conditions is similar to reference condition watersheds, hydrologic connectivity, and sediment regime is within the natural range of variation) (Forest Plan 2019 pages 50-52, FW-DC-WR-01-06, 16-18);
4. Improve habitat conditions (e.g., amount, distribution, and connectivity of habitat, forage availability, seclusion) for big game, surrogate species, and federally protected species (Forest Plan 2019 pages 59-60, FW-DC-WL-02 – 04 and 10-14);
5. Support local jobs and labor income within the counties surrounding the forest through a predictable and sustained flow of timber and forest products within the capability of the ecosystem (Forest Plan 2019 page 87, FW-DC-RFP-01).
6. Provide a system of safe and sustainable authorized roads and bridges that provides public and administrative access where suitable and supports forest management objectives (Forest Plan 2019 page 71, FW-DC-AS-01).

Background information supporting the need for the proposal can be found in specialist reports which are incorporated by reference. These reports are available in the project record at the Newport-Sullivan Lake Ranger District office in Newport, Washington, or on the project website at <https://www.fs.usda.gov/project/?project=54090>.

2.0 Proposed Action and Alternatives

2.1 Alternatives Considered but Eliminated from Detailed Study

One potential alternative was proposed by the public during the July/August 2019 scoping period and a requested public meeting held on August 20, 2019. After review by the project interdisciplinary team (IDT) and the responsible official, it was determined that this alternative would not be analyzed in detail.

2.1.1 Road Management (reduce existing road system; no new system or temporary roads)

Input from the public during the scoping period included an alternative that follows restoration and proforestation² principles, preserves at least half of the project area as intact forests and unroaded areas, results in a road system that is fully affordable to maintain on an annual basis, would reduce the existing road system in the project area subwatersheds to a density of 0.5 mi/mi² or less, and would not construct any new system or temporary roads.

Preserving one-half of the project area as unroaded areas:

² Proforestation - refers to the practice of protecting existing natural forests from human disturbance; or growing existing forests as intact ecosystems.

This would not meet the management direction in the Forest Plan, nor would this meet the purpose and need for the Sweet-Ione project to trend the forest to the historic range of variability and improve resilience to disturbance (objective 1), reduce hazardous fuels (objective 2), support the local economy (objective 5) or provide public and administrative access (objective 6).

Reduce road system to fully affordable level:

Maintenance, resource, and public access needs were reviewed during the IDT review of the road system located within the Sweet-Ione project area. Road closure and decommissioning proposals meet Forest Plan direction to move the project area toward road density goals (Forest Plan 2019 page 63, FW-STD-WL-07; page 107, MA-DC-FR-05; page 110, MA-DC-GR-05). Full reduction of road density to Forest Plan desired condition levels would impact access to other ownerships and reduce access to recreation opportunities (Objective 6).

Do not construct any new system or temporary roads:

No new system roads are proposed. If commercial harvest units currently proposed for access by temporary roads were retained in the proposed action without the associated road access, the cost of treatments would increase management costs significantly (harvest system would move to more expensive options such as helicopter operations; more labor-intensive work for post-harvest treatments such as fuel treatments) and reduce economic feasibility of completing the harvest and post-harvest treatments.

Removal of units no longer economically viable or that would no longer be able to be treated could reduce commercial management opportunities by approximately 20% and non-commercial fuel treatments by approximately 15% (Figure 2, Appendix A).

Since this alternative would not meet Forest Plan direction, or Purpose and Need Objectives 1, 2, 4, 5, or 6, this alternative was not analyzed in detail.

2.2 Proposed Action

The Forest Service (FS), with input from collaboration partners, the public, and other stakeholders, is proposing the actions in Tables 1 - 6 to meet the needs as described in the Purpose and Need and shown on the Proposed Action Map (Figure 3, Appendix A). The FS is proposing to treat approximately 7,880 acres³ of vegetation within the approximate 20,435-acre project area with a variety of methods. Most commercial treatments would be followed by non-commercial treatments. Non-commercial treatments may overlap areas receiving commercial treatments.

Following field surveys and responses to scoping, changes to the proposed action between scoping and the draft environmental assessment include:

- an additional 4 units (87-90) totaling 365 acres of commercial and non-commercial treatments were added between the draft and final proposed actions;
- an overall reduction of 1,235 acres, from a variety of units, due to considerations for late structural stage stands, wildlife, aquatic vegetation, hardwood component, and others;
- closing 3.5 miles of open road (down from 9.5 miles).

³ Treatment acres are approximate and have been rounded to the nearest 5 acres.

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Commercial vegetation treatments and the acres associated with those treatments are described in Table 1, and are proposed to address insect or disease or both insect and disease concerns, help develop stands to meet HRV, reduce fuel levels and risk of uncharacteristic wildfires, and improve wildlife habitat.

Table 1. Proposed commercial vegetation treatments, acres, and descriptions within the project area

Treatment Type	Acres	Treatment Description ¹
Shelterwood	1,240	A regeneration harvest method that removes trees, except those needed for regeneration purposes. This type of harvest prepares the seed bed and creates a new age class of trees. Reserve trees would be retained to create a two-aged stand of a desired species composition. Additional live trees would be retained for reasons other than regeneration, such as trees meeting the large tree guidelines, wildlife trees, or trees that would be retained for other silvicultural reasons. Planting of desirable tree species may follow shelterwood treatments in areas lacking natural regeneration or desirable seed trees.
Thinning	3,505	Thinning typically targets suppressed or intermediate trees for removal. Some dominant and co-dominant trees may be removed to meet stand density objectives or to favor healthier trees.
Mixed Harvest	3,135	Both shelterwood (60%) and thinning (40%) treatments would occur.
Total Acres	7,880	Expected timber volume is 40-60 million board feet (MMBF)

¹ Removal of undesirable seedlings to small pole-sized trees may occur within the 7,880 acres following commercial vegetation treatments.

² Ground-based treatments proposed include approximately 7,815 acres with the remaining 65 acres proposed for skyline treatments.

Table 2 displays fuels treatments that would occur following commercial treatments. These treatments would take place on the same lands the commercial treatments would occur on.

Table 2. Post-Harvest Fuels Treatments following Commercial Treatments

Treatment Type	Acres	Comments
Grapple pile and burn piles	5,335	Machine piling of slash would occur within commercial treatment units to reduce fuel loading associated with slash that is in excess of large woody material and soil productivity objectives. Piles are often burned.
Grapple pile, burn piles, then under burn	385	Machine piling of slash would occur within commercial treatment units to reduce fuel loading associated with slash that is in excess of large woody material and soil productivity objectives. Piles are often burned. This may be followed by under burning at a later date.
Under burn	2,160	Use prescribed fire to reduce logging slash, remove undesirable regeneration, promote the growth of fire-adapted tree species, and rejuvenate grasses and desirable browse species for wildlife.
Total Acres	7,880	

Management of (primarily) non-commercial size trees (e.g., saplings) shrubs, slash, and other fuels are proposed to address insect or disease or both insect and disease concerns (Table 3), help develop stands to meet HRV, reduce fuel levels and risk of uncharacteristic wildfires, and improve wildlife habitat. These activities include acres both within and outside proposed commercial treatment units. Many of these treatments may overlap within non-commercial treatment units.

Table 3. Proposed non-commercial vegetation treatments, acres, and descriptions within the project area

Treatment Type	Acres	Treatment Description
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Treatment Type	Acres	Treatment Description
Pre-commercial Thinning and White pine pruning may be followed by hand piling of fuels and burning of those piles	2,045	Seedling to small pole-sized trees (typically < 7.0 inches in diameter at breast height [DBH]) would be thinned to a set spacing (typically 12 feet) and by species priority. Lower branches of white pine would be removed (no greater than 1/3 the height of the tree) using hand tools to reduce the potential spread of white pine blister rust. Treatments would occur on approximately 1,730 acres outside of treatment units and approximately 315 acres within treatment units. Thinning and pruning may be followed by hand piling of slash within pre-commercial thin units to reduce fuel loading associated with slash that is in excess of large woody material and soil productivity objectives. Piles would then be burned.
Whip-fell	3,380	Remove undesirable seedling to small pole-sized trees to release desirable regeneration, enhance huckleberry patches, or both within commercial treatment units and within under burn units outside of commercial treatment units.
Tree Planting	3,400	Re-establish trees through planting or interplanting in openings created through timber harvest, in areas of mortality due to insect and disease, along stream corridors (425 acres) as needed to increase shading or long-term coarse woody material recruitment, and in areas of decommissioned roads and closed road entrances.
Under burn outside commercial treatment units	1,095	Use prescribed fire and mechanical fuels treatments to reduce the risk of uncharacteristic wildfires. The intent would be to reduce surface fuels, stand understories and fuel ladders; raise the live crowns of overstory trees; promote the growth of fire-adapted tree species; and rejuvenate grasses and desirable browse species for wildlife. Prescribe Fire = 1,010 ac Mechanical Fuels Treatments: Ladder Fuels Thin and Pile = 60 ac Shaded Fuels Break = 25 ac
Aquatic wood source units	345	Source of material for Large Woody Material (LWM) placement. Trees would be removed specifically for placement in creeks to improve aquatic habitat complexity. Trees, 15 inches DBH or greater, may be cut on site and moved to streams or felled directly into the stream. In some cases, root wads would remain intact. In general, canopy cover would not be expected to change. Consists of 175 upland acres and 70 riparian acres.
Total Acres	10,265	

Road activities proposed to access treatment units, provide access for future management actions, and improve watershed conditions are displayed in Table 4.

Table 4. Proposed road management activities designed to move toward a more sustainable road system, provide access where appropriate, and improve subwatershed condition**

Proposed Road Work ⁴	Approximate Length* (miles)	Description
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⁴ Region 6 Guidance for Temporary and Specified Roads on Vegetation Management Projects

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Proposed Road Work⁴	Approximate Length* (miles)	Description
Build new temporary roads ⁵ and restore the area after use.	8.0	<p>Construct temporary roads to access project activities using existing road templates, unauthorized routes, old skid trails, and other previously impacted areas to the fullest extent possible.</p> <p>Temporary roads and existing templates extending from temporary roads would be returned to a more natural condition⁶ following project activities using any or all of the following actions:</p> <ul style="list-style-type: none"> • recontouring the existing roadbed to match the adjacent topography, • removing culverts or other stream channel crossing structures, • seeding or planting trees or both, • soil decompaction, and • placement of down woody material or rocks • or other similar restoration activity
Close existing National Forest System (NFS) open roads	3.5	<p>Close to public (motorized) use with gates or other means. For those roads which access NFS lands only, replace gates with earthen berms / boulders installed on the road entrance, post-project. Closed roads would be hydrologically stabilized.</p>
Decommission existing NFS roads	9.0	<p>Render roads undrivable through a variety of methods such as, but not limited to, sub-soiling, re-contouring, or removing culverts. Decommissioning methods are the same as those described above under build new temporary roads. 1.75 miles proposed for decommissioning are currently open. Decommissioning would occur on the end portion of existing roads.</p>
Obliteration of unauthorized routes	8.0	<p>Remove unauthorized routes and restore the area following project activities using any or all of the following actions:</p> <ul style="list-style-type: none"> • recontouring the existing roadbed to match the adjacent topography, • removing culverts or other stream channel crossing structures, seeding, • planting trees soil decompaction, • and placement of down woody material or rocks or other similar restoration activity. <p>Unauthorized routes discovered during implementation</p>

⁵ If a temporary road needs to remain in place for longer than one operating season, then stream crossings must follow BMPs and meet the intent of the WDFW MOU.

⁶ Temporary roads would be obliterated within five years following commercial treatments.

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Proposed Road Work⁴	Approximate Length* (miles)	Description
		would be reviewed by IDT specialists for inclusion in restoration treatments.
Change roads from open to highway legal only vehicles to open to all vehicles.	1.5	Change status of NFS road 1715421 as open to all vehicles from its intersection with NFS road 1715422 to its intersection with NFS road 1715370.
Smackout Gravel Pit	5 acres	Develop new gravel pit to provide materials for road work during project activities and beyond.

*Miles are approximate and rounded up to the nearest 0.5 mile.

Overall, NFS **open road mileage would be reduced by 5 miles following implementation of these actions.

Activities proposed to improve subwatershed conditions are listed in Table 5. The majority of activities are proposed to improve instream habitats; others are focused on wetlands or meadow habitats.

Table 5. Activities proposed to improve subwatershed condition

Proposed Aquatic / Subwatershed Restoration Treatments	Approximate Units	Description
Large woody material placement	12.0 miles*	Place Large Woody Material (LWM) into streams to increase instream cover and habitat complexity. Wood may be imported, or trees could be felled on-site for placement in streams. Tree placement within streams would require entry into RMA Zones 1 with mechanized equipment.
Remove or upgrade culverts	24 culverts	Improve aquatic organism passage in streams
Remove Crib Dam	1 crib dam	Restore instream channel function.
Meadow Restoration	35** acres	Maintain or improve Cameron and Big Muddy meadow habitat through a variety of actions such as conifer removal, plantings, thinning, fencing, prescribed burning, or other restoration activities.

*Miles are approximate and rounded up to the nearest 0.5 mile

**Acres are approximate and rounded up to the nearest 5 acres

2.3 Design Elements in Proposed Action

The IDT developed design features to minimize or avoid adverse effects which could occur as a result of implementing the proposed activities. The design features are based on Forest Plan direction and policy, best available science, site-specific evaluations, and public concerns; and would be applied during project implementation. Standard practices that would also apply to project implementation are in Appendix A-Standard Practices.

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Table 6. Design Elements

Nbr	Resource	Design Element	Locations Units/Roads
DE-1	Aquatics	Stream crossings Temporary roads require a physical structure to cross perennial streams. Follow temporary culvert guidance (page 13 of WDFW MOU) ⁷ if left in place up to one year. Follow permanent culvert guidance if culvert will be left in place more than one year (page 9 of WDFW MOU). Coordination would occur between presale and the aquatics team.	6, 46 (2 perennial crossings), 48, 58, 63, 89, 90
DE-2	Aquatics	Stream crossings Limit temporary road crossings of intermittent stream channels without a structure to dry or frozen conditions or install a culvert to cross while intermittent stream is flowing, according to MOU guidance on culverts (see MOU Guidance in DE-1). This may be modified following consultation with the District Hydrologist or Fisheries Biologist and approved by the District Ranger.	6, 21, 29, 41, 46, 47, 48, 49, 50, 51, 58, 63, 79, 89, 90 and any other units with stream crossings within RMA
DE-4	Aquatics	Closed Roads Closed roads (Maintenance Level 1 (ML1)) not hydrologically stabilized would be maintained in a drivable condition with drainage control measures effectively maintained during project activities. Control measures (e.g., culverts) would be removed upon completion of the project.	ML1 roads: 1700 -433, -437, -438, -609 1715 -430, -440, -445
DE-5	Botany	Sensitive Plant Protection Avoid ground disturbance within 100 feet of known populations of crenulate moonwort, western moonwort, stalked moonwort, beaked sedge, crested shield-fern, green keeled cotton-grass, water avens, black snakeroot, and kidney-leaved violet.	Project area Commercial Units: 1, 3, 19, 56, 60, 71, 84, 89, and 164. Hazardous Fuels Unit 5

⁷ Appendix A of the MOU provides design and implementation standards for common types of hydraulic activities. Appendix B of the MOU provides for implementing types of Forest Service hydraulic activities that are not described in Appendix A, or for projects that do not meet both the general provisions and the project specific provisions specified in Appendix A. For these projects the Forest Service will collaborate with WDFW to develop appropriate project design and implementation provisions on a site-specific basis.

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Nbr	Resource	Design Element	Locations Units/Roads
DE-6	Botany	Meadow Maintenance Do not burn wet meadow plant communities unless unwanted woody vegetation is encroaching on drier mesic edges or inclusions. Pile-burn excess wood created by cutting encroaching woody vegetation. Mesic sites would be broadcast burned on a case-by-case basis after an ecologist and botanist determine the activity is environmentally beneficial and that long-term impacts to plant communities are not likely. Broadcast burning may occur on dry meadow plant communities where historic frequent wildfire would have been a primary driver. Survey affected meadows for ‘special status’ species. Document, flag, relocate, and avoid all potentially affected populations. Restore affected meadows as needed and practicable post-harvest.	Cameron Meadows in Unit AQ-3 Units 2 and 3
DE-7	Botany	Meadow Maintenance Coordinate hand removal (e.g., chainsaw) of a portion of conifers within 200 feet of meadow boundaries (hand pile/burn piles) with the Forest Botanist or Fuels Specialist to provide adequate sunlight for the promotion of native meadow forbs and grasses.	Cameron Meadows in Unit AQ-3 and Units 2 and 3
DE-9	Heritage	Cultural Coordinate with forest heritage staff for monitoring during removal of trees with intact root wads.	Aquatic units 1-4
DE-10	Range	Livestock Containment Install up to 0.5 mile of fence line extension, if needed, to keep livestock from drifting between the Tiger Hill and Meadow Creek allotments along Meadow Creek Road (C-2695)	Units: 61 and 64
DE-11	Range	Livestock Containment Consult with range specialist to leave natural barriers in place to deter cattle from sensitive or restricted areas (e.g., powerline corridor, private property, housing development). Treatments may be left adjacent to natural barriers as long as objectives could still be met	Unit 40: western portion along FSR 1710500 or C-2688; southeast corner along power line corridor Unit 77: eastern portion along road 1710445 Unit 81: north of Hank’s Butte Road
DE-12	Range	Livestock Containment Install cattle guard and 0.5 to 1 mile of drift fence in consultation with the range specialist if livestock drift is identified.	Units 81 and 84: along Hanks Butte Road

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Nbr	Resource	Design Element	Locations Units/Roads
DE-13	Recreation	High-Value⁸ Dispersed Recreation Sites High-value dispersed recreation sites identified and mapped by the District Recreation Specialist should be treated to enhance the long-term health and sustainability of the vegetation (overstory as well as understory) within the immediate foreground zone (0-300 feet) of each dispersed recreation site so that shade, screening, and dust control are provided while also meeting the scenic integrity objective associated with each high-value dispersed recreation site.	FS roads: 1700 -430, -438, -319, -462, -440, -444, -601 1710 -432 3140
	Recreation	Snowmobile Routes Impacts to <i>groomed</i> snowmobile routes would be reduced on the identified affected roads in units 81-86. Snowplowing on these routes would be coordinated with the District Recreation Specialist and approved by the District Ranger. Snowplowing would only occur on one of these routes at a time and would be limited to a single winter season unless otherwise approved by the District Ranger. Alternative routes for groomed trails may be identified by the District Recreation Specialist and approved by the District Ranger to off-set the loss of groomed access due to winter harvest and haul. Press releases, signing, traffic control and other mitigation measures would be required prior to use of these snowmobile routes.	NFS roads affected: 3140440 3140442 3140452 3140456 Units: 81 – 86
DE-14	Recreation	Snowmobile Routes Coordinate with public affairs and district recreation specialist to notify the public and place signs in areas where plowing, hauling, or moving equipment on designated <i>ungroomed</i> snowmobile routes would occur between December 1 and the end of the snowmobile season.	NFS roads 1700 -466, -462, -452 1710 -000, -415, -430 1715 -421
DE-15	Scenery	Scenic Travel Routes Minimize evidence of marking activities to maintain scenic integrity.	Smackout Pass Road (County Road (CR) 2714) Meadow Road (CR 2695)
DE-16	Scenery	Scenic Travel Routes After obliterating temporary roads, recontour slopes, scarify roadbed, and plant native grasses to ensure natural revegetation is established in 2 to 10 years. Use signage and natural materials (rocks, logs) to restrict public use until vegetation is restored.	Smackout Pass Road (CR 2714) Meadow Road (CR 2695)

⁸ High-value dispersed recreation sites are defined by CNF recreation employees as a site that has a well-delineated parking and campsite area (typically, grass and other herbaceous vegetation is gone and duff or mineral soil is prevalent in the regularly used portion of the site), a substantial rock fire ring (can be large or small, but are well constructed with no vegetation in or around the ring), may contain user created furniture (benches, seats, or tables made out of logs or dimensional lumber), game hangers, trails (leading away from the site), or other evidence of human occupancy (corrals, targets, tree damage, etc.). We settled on the term high value to represent how the public views these sites.

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Nbr	Resource	Design Element	Locations Units/Roads
DE-17	Scenery	<p>Scenic Travel Routes</p> <p>Enhance landscape character by increasing vegetation variety, promoting different age classes of tree species, and thinning to expose large Ponderosa pine and Douglas fir boles and fall colors of western larch stands for viewing along travel routes.</p> <p>Leave clumps of varying sizes of overstory and understory along the foreground of travel routes and trailside zones. Use irregular clumping and feathering of unit edges to avoid introducing lines that could result from unit edges</p>	<p>Smackout Pass Road (CR 2714)</p> <p>Meadow Road (CR 2695)</p>
DE-18	Scenery	<p>Scenic Travel Routes</p> <p>In seen areas, group snags and cavity trees with reserve islands. If single trees are reserved, they should be within 200 feet of the edge of existing vegetation. Single trees in the immediate foreground generally should be greater than 10 inches diameter at breast height.</p>	<p>Smackout Pass Road (CR 2714)</p> <p>Meadow Road (CR 2695)</p>
DE-19	Scenery	<p>Scenic Travel Routes</p> <p>Use natural features, road templates, and hand-made firebreaks (trenches and furrows) where practicable to reduce dozer-made fire breaks and ground disturbance. Rehabilitate fire breaks post-activity. Design fire breaks to reduce linear appearance as viewed from recreation use area.</p>	<p>Smackout Pass Road (CR 2714)</p> <p>Meadow Road (CR 2695)</p>
DE-20	Scenery	<p>Scenic Travel Routes</p> <p>Maintain high scenic quality settings along the foreground and middleground distance zones of designated scenic travel routes used for year-round recreation.</p> <p>Manage the foreground (up to ½ mile distance zone or seen area) to minimize visual impact of vegetation and fuels reduction activities and provide a roaded natural experience.</p> <p>Scenic Integrity Objectives (SIO's) for Moderate or High. Repeating form, line, color, texture, pattern, and scale common to the valued landscape character being viewed is the most effective way to maintain scenic integrity in the high and moderate scenic integrity objective levels</p>	<p>Applies to High to Moderate SIO:</p> <p>Smackout Pass Road (CR 2714)</p> <p>Meadow Road (CR 2695)</p> <p>Applies to High SIO:</p> <p>International Selkirk Loop-North Pend Oreille Scenic Byway viewshed: high SIO</p>
DE-21	Soil	<p>Prime Farmland</p> <p>Landings should not be placed in areas designated as prime farmland. Soil scientist should be contacted to confirm the location of prime farmland during layout if required.</p>	<p>Unit 27</p>

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Nbr	Resource	Design Element	Locations Units/Roads
DE-22	Soil	Soil Conditions Conduct timber harvest on ground-based units where at least 10% detrimental soil conditions exist, when 90% of the unit's soil is covered by 8 inches of compacted snow, 8 inches of frozen soil, or a combined 8 inches of snow and frozen soil. Or conduct timber harvest using cut to length logging systems where stand density supports covering forwarder trails with 8 inches of compacted slash, or reuse any existing skid trails, landings, and road templates to reduce ground disturbance. Goal: to ensure that cumulative detrimental soil conditions remain at or below 20 percent.	Units 11, 26, 29, 54, 55
DE-23	Wildlife	Late-Closed Associated Species Habitat Retain sufficient unmanaged habitat to remain within HRV in the subwatersheds. There is an opportunity to thin selected habitat polygons in the Big Muddy Creek subwatershed to improve stand health and tree growth. Retain 50+% canopy closure, averaged over the unit.	Units 135, 151, 164, 179, 188
DE-24	Wildlife	Big Game Seclusion To provide adequate seclusion habitat for wintering big game, conduct no project activities between December 1 and March 31 in the identified units.	Cedar Creek: Units 11, 12, 13, 14, 19, 20, 21, 22, 25, 26, 27 Big Muddy Creek: Units 72, 73, 76, 77, 79
DE-25	Wildlife	Raptor Nesting Habitat – Goshawk Complete no adverse management activities (i.e., commercial timber harvest, prescribed burning) within the 30-acre nest stands mapped around active goshawk nests.	Units: 68, 135, 141, 142
DE-26	Wildlife	Raptor Nesting Protection - Goshawk Project activities would not be conducted within 0.25 mile of active goshawk nests from March 1 to August 31, to avoid disturbance to birds during this critical period. This measure would apply to timber harvest, pre-commercial thinning, road construction and reconstruction, prescribed burning, mechanical fuels treatments, and other projects involving persistent heavy equipment operation. This measure would not apply to use of roads open to the public (i.e., for timber hauling) or to routine road maintenance / light reconstruction.	Units 135, 141, 142, temp road into Unit 41
DE-27	Wildlife	Snag Creation If post-harvest snag levels in created openings do not meet those prescribed in Table 7 the Forest Plan (Page 36), top live green trees to create snags to mimic habitat levels in unmanaged stands. Consider topping groupings of trees, particularly in the Lodgepole Pine and Montane Mixed Conifers habitat types.	Shelterwood and mixed harvest units

Nbr	Resource	Design Element	Locations Units/Roads
DE-28	Wildlife	Lynx Habitat Unless they are at risk of being lost to insects, disease, or senescence, retain patches of multi-storied trees as uncut “skips” in the identified units. Retain hiding cover on the ridge making up the western edge of Unit 1 to facilitate wildlife movement along the ridge, in consultation with the biologist.	Unit 1, and those portions of Units 2, 3, 6 which overlap lynx range

2.4 Monitoring

The monitoring activities described below would be taken during and following the proposed actions to determine if treatments follow the proposed actions, incorporate design criteria, meet the purpose and need, and are effective.

- *Road Closures*: Road closures would be monitored annually for up to five years to determine their effectiveness. If monitoring reveals a closure is ineffective, take additional steps (e.g., re-install berms) to increase closure effectiveness.
- *Invasive Plants*: Treat and monitor road systems, landings, fuel breaks, gaps and other disturbed areas for five years following road construction.⁹ The effects of managing invasive plants are disclosed in the Pacific Northwest Region Invasive Plant Program FEIS (2005) and are incorporated by reference.
- *Vegetation Management*: All vegetation management projects would be monitored both during and after treatment to determine if management direction and guidelines are being met. Monitoring would check that marking is meeting the prescription and marking guide. Monitoring would also be conducted during harvest operations to ensure prescriptions are being met. Post-harvest reviews would be conducted within one to three years after harvest to determine if the harvest met the prescription and if any changes to the fuels, site preparation, or reforestation are needed. A post-harvest silvicultural review would be done on a random sample of activity units within the analysis area no later than one year post-project completion. Information from field visits would inform internal after-action reviews, identify the degree to which silvicultural objectives were met, and identify if any changes would be needed to post-harvest activities.
- *Regeneration*: Natural and artificial regeneration occurring following treatment would be evaluated for species composition and number of trees per acre. Survival surveys in plantations would be conducted the first and third year following harvest to ensure the unit is fully stocked with seedlings.
- *Fuels*: Fuels monitoring would occur in selected units and include pre-burn and post-burn photo/visual monitoring. In addition, photo-plots, duff/fuel depth measurements, and vegetation sampling plot monitoring may also be conducted.

⁹ Forest Plan 2019 page 68 FW-STD-IS-01 Invasive Plant Prevention

- *Fuels*: During prescribed burning, smoke conditions would be monitored using a variety of methods (e.g., smoke camera, air quality sensors) and follow the Interagency Prescribed Fire Planning and Implementation Procedures Guide (National Wildlife Coordinating Group: PMS 484, 2017).
- *Insect and Disease*: Annual Aerial Forest Insect and Disease surveys would identify the locations and severity of insect and disease populations. Particular attention would be made to monitor tree mortality and subsequent insect activity in units where prescribed fire is applied. The surveys would be reviewed by the silviculturist and would provide information on insect and disease trends, success of treatments, and would inform future management decisions.
- *Water Quality*: Stream temperature and bacteria monitoring would be performed annually to identify the status and trend of water quality impaired streams per a Memorandum of Agreement with the Washington Department of Ecology.
- *Best Management Practices*: Harvest and fuels treatment units, decommissioned roads, and hydrologically stabilized closed roads would be field reviewed for implementation effectiveness. Temporary roads would be field reviewed for implementation effectiveness during use and post-use obliteration.

3.0 Environmental Impacts of the Proposed Action

Environmental impacts from a proposed action can be direct, indirect, and cumulative. Direct effects occur at the time and place a proposed action is implemented. Indirect effects are reasonably foreseeable, and occur farther way or later in time in the short-term or long-term (less than five years or greater than five years, respectively). Cumulative effects can occur when the incremental impact of a proposed action is added to impacts from past, present, and reasonably foreseeable actions.

Individual resource reports are incorporated by reference and available in the project record at the Newport Ranger District office, or electronically at <https://www.fs.usda.gov/project/?project=54090>.

3.1 Resources not Analyzed

Special uses and minerals, scenery, and climate change had either no effects, or negligible effects from the proposed action. Details of these resources are available in the project record and incorporated herein.

3.2 Silviculture and Fuels

The objective for vegetation is to move forest stands toward their historical range of variability (HRV) for structure, patch size, and tree species composition. The Sweet Ione silviculture and fuels resource report breaks out the forest structure resource indicators for current, post-harvest, and HRV. In the project area, there is currently too many mid closed acres in all of the vegetation types. Treatments are focused on these mid closed stands to set up the stands to move into the other stages. In the short-term, many mid closed stands would be treated to move forest structure towards HRV. Some late closed stands that are within HRV would be treated to move stands into other forest structures, some of which are deficient across the landscape. Treatments would meet the objective by moving stands towards the HRV by vegetation type over time.

3.2.1 Spatial and Temporal Context for Effects Analysis

Spatial (Location and Scale): Forest conditions are analyzed at both the stand and landscape-level. HRV conditions of forest structure were analyzed at the subwatershed level. The planning area boundary does not follow the subwatershed boundaries, but forest conditions must consider all vegetation within the watersheds that intersect the planning area.

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Temporal (Time): This analysis measures effectiveness of vegetation treatments both in the short and long term. Effects of treatments occurring within 10 years would be considered short term. Long term effects would be those occurring 11 to 50 years following treatments.

3.2.2 *Direct and Indirect Effects*

Forest Structure

Table 7. Percent Current, Post-Harvest, and Historic Forest Structure by Vegetation Type in the Sweet-Creek Subwatershed

Vegetation Type		Early	Mid Open	Mid Closed	Late Open	Late Closed
Douglas-fir dry	Current (%)	6	2	77	0	14
	Post-Harvest (%)	6	26	53	2	13
	Historic (%)	6-16	2-8	4-13	38-78	1-32
Northern Rocky Mountain Mixed Conifer	Current (%)	4	3	80	0	13
	Post-Harvest (%)	4	25	57	1	13
	Historic (%)	9-25	1-3	18-30	4-6	44-60
Western Redcedar / Western Hemlock	Current (%)	4	3	72	0	21
	Post-Harvest (%)	4	18	57	0	21
	Historic (%)	4-24	0	7-27	0	55-83
Subalpine fir / Lodgepole pine	Current (%)	8	18	74	0	1
	Post-Harvest (%)	8	23	68	0	1
	Historic (%)	45-65	0	33-53	0	3
Spruce / Subalpine fir	Current (%)	1	3	93	0	3
	Post-Harvest (%)	1	60	35	0	3
	Historic (%)	14-46	0	13-41	0	29-57

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Table 8. Percent Current, Post-Harvest, and Historic Forest Structure by Vegetation Type in the Sweet-Creek Subwatershed in the Big Muddy Creek Subwatershed

Vegetation Type		Early	Mid Open	Mid Closed	Late Open	Late Closed
Douglas-fir dry	Current (%)	11	3	72	0	14
	Post-Harvest (%)	11	3	72	0	14
	Historic (%)	6-16	2-8	4-13	38-78	1-32
Northern Rocky Mountain Mixed Conifer	Current (%)	11	1	70	0	18
	Post-Harvest (%)	11	26	45	2	16
	Historic (%)	9-25	1-3	18-30	4-6	44-60
Western Redcedar / Western Hemlock	Current (%)	8	1	54	0	37
	Post-Harvest (%)	8	13	42	0	37
	Historic (%)	4-24	0	7-27	0	55-83
Subalpine fir / Lodgepole pine	Current (%)	8	7	74	0	11
	Post-Harvest (%)	8	23	68	0	1
	Historic (%)	45-65	0	33-53	0	3
Spruce / Subalpine fir	Current (%)	17	7	64	0	11
	Post-Harvest (%)	1	60	35	0	3
	Historic (%)	14-46	0	13-41	0	29-57

Direct Effects

Commercial thinnings and regeneration treatments would mainly take place in mid-closed stand structures, with patches of other structure stages occurring within the units. Treatments would affect forest structure by moving some mid-closed stands toward mid-open structure stages in the short-term, with others remaining mid closed.

Over the long-term commercial treatments should increase growth and vigor helping the stands to move quicker towards later structural stages which we are lacking. Under the proposed action, canopy cover will be reduced in the short term and some stands will go from a closed structural stage to an open one. Over time as trees grow larger due to increased growing space, light, moisture, and nutrients these stands would move from mid-open to mid-closed or late-closed.

The largest trees (20 inches dbh and greater) would mostly be identified for retention in all treatment types. This would trend stands toward late stand structures, which are currently deficient in most vegetation types. However, trees over this diameter may be removed for safety, operations, to meet desired conditions for structural stages, limit the spread of insect infestation or disease, where needed for fuel reduction, or to promote special plant habitats.

Species composition within a stand would be modified by removing trees through thinning. Shade tolerant trees that have a low tolerance for fire would be removed in higher quantities in Douglas-fir dry and Rocky Mountain Mixed Conifer vegetation types. Shade intolerant species which are more fire tolerant can be favored. There would also be exceptions to this such as developing thermal cover for big game, providing shade adjacent to riparian areas within dry to moist site vegetation types, or leaving trees with desirable for wildlife. Shade tolerant species would be left in appropriate historical vegetation types, in moist or wet aspects, or wet microsites.

Some late open and late closed stands would be harvested under the proposed action. Patches of late-open and late-closed stand structures, stands with biological legacies and groups of trees with diameters greater than 20 inches have been identified during field visits.

Precommercial thinning would change the structure stage of stands from mid closed to mid open immediately following treatment. These stands would trend towards mid closed over the next 30 years or more.

Indirect Effects

While one of the objectives of this project is to aid in moving the forest back to its HRV, an indirect effect would be the economic value gained from commercial treatments. The economic return from commercial harvest treatments could be used to do future precommercial thinning, prescribed burning, mastication, or other maintenance treatments. The proposed action for this project would provide economic benefit to the local economy through the harvest of approximately 59 MMBF of timber.

Some late-closed stands may be prone to high severity damage from wildfire, which would cause a change to the structure stage in the immediate patch. However, these areas are somewhat small and scattered throughout the project area, so they may be surrounded by treatment areas that decrease the rate of fire spread or severity. Some trees may be susceptible to wind damage if the surrounding stand is heavily cut.

If no action was taken then there would be no direct change of structural stages or trending of stages toward HRV conditions through commercial harvest, precommercial harvest, prescribed burning, and other actions in the short-term. There will be little to no increase in the amount of mid and late-open stands without some disturbance.

Forest Health and Wildfire Resiliency

Table 9 and 10 show resource measures for the existing condition and proposed action for stand density, stocking levels, and mortality for commercial thinning and regeneration treatments.

Table 9. Forest Health and Wildfire Resiliency Resource Indicators and Measures for the Proposed Action for Commercial Thinning

Measure	Existing Condition	Proposed Action
Basal Area (BA)	Avg: 187 ft ² Range: 123-254 ft ²	Target Avg.: 60-80 ft ²
Trees per acre (TPA)	Avg: 197 Range: 140 – 290	Target: 40-100

Measure	Existing Condition	Proposed Action
Stand Density Index (SDI)	Avg: 306 Range: 224 - 423	100-160
Volume loss, cubic feet per acre per year	46 ft ³ /acre	10 ft ³ /acre

Table 10. Forest Health and Wildfire Resiliency Resource Indicators and Measures for the Proposed Action for Regeneration Treatments

Measure	Existing Condition	Proposed Action
Basal Area (BA)	Avg: 187 ft ² Range: 123-254 ft ²	Target Avg.: 20-50 ft ²
Trees per acre (TPA)	Avg: 197 Range: 140 – 290	Target: 10-50
Stand Density Index (SDI)	Avg: 306 Range: 224 - 423	40-80
Volume loss (Mortality), cubic feet per acre per year	46 ft ³ /acre	6 ft ³ /acre

Direct Effects

In general, commercial treatments would promote retained trees to grow more vigorously, create conditions beneficial for prescribed burning, and increase resilience and resistance to disturbance. Mortality or volume loss would also be reduced.

As more acres of the slow growing or stagnant stands are brought under stocking level control, stand vigor would improve. Insects and diseases can be species specific in the range of hosts they would attack. By maintaining a species mix that contains multiple species within the stand, the risk of stand loss to any one single insect or disease is reduced and beneficial to long-term growth of the stand (Campbell and Liegel 1996; Carlson and Wulf 1989, Cochran et al. 1994, Edmonds et al. 2000). Therefore, by controlling basal area and reducing stocking, tree vigor would increase and changes in species composition would increase stand resiliency to insect and disease.

Basal area, trees per acre, and stand density index are directly decreased through removing trees during commercial harvest, pre-commercial thinning, and prescribed burning. Noncommercial treatments such as grapple piling, pile burning, and whip felling would also remove some small trees, driving density lower. Stand density may also decrease with planned underburns due to fire-related injury and delayed mortality. Tree planting would increase stand density over time as trees grow and allow for control of species composition. These trees would eventually grow into the available growing space over time due to the increase in sunlight, available nutrients and water, and planting. The extra growing space is beneficial to small trees to provide a longer period for increased growth and resilience.

Treatments along the urban interface would aid in reducing the risk of insect, disease and fires spreading between Forest service, private and other ownerships lands and vice versa. .

Thinning and other stand treatments can influence subsequent fire behavior at the stand level by either increasing or decreasing fire intensity and associated severity of effects. There are differing views on how fires affect forests when fires occur post-treatment. Thinning can effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire-adapted species. Such intermediate treatments can reduce the severity and intensity of wildfires for a given set of physical and weather variables (Graham et al. 1997, Graham et al. 1999, Graham et al. 2004). A study conducted by Bradley et al. 2016 found that protecting forests from timber harvest resulted in lower fire severity. Another study found that Forest Service management was found to produce forest conditions most resilient to high-severity wildfire than some surrounding state or private ownerships (Charnley et al. 2017).

Indirect Effects

The economic return from commercial harvest treatments would be the same as in forest structure above,

Treatments within and around aspen stands would release aspen trees and clones that are currently suppressed by conifers. The increase in light and growing space from the removal of conifers would result in increased growth rates for aspen. Cutting individual aspen trees or using prescribed fire in these stands would increase aspen sprouting.

Indirectly, mortality could occur to the residual stand from logging damage or post-fire delayed mortality from underburn operations (Hood and Bentz 2007). Endemic insect activity may also contribute some amount of mortality to the stands in Ione, but these are likely to be minimized with the proposed activities in the area.

Removal of advanced regeneration may set the stand back from trending towards closed conditions for a longer time period. However, the benefit is added growing space for residual trees to continue growing at a faster rate.

Dense stands have a greater risk to stand replacing fires due to their closed canopy structure which enables the spread of fire from crown to crown. Multi-storied stand structures are often more susceptible to crown fires due to ladder fuels. Increased mortality from inter-tree competition, insects, and disease would result in more fuel and higher intensity fires.

There would be no silvicultural treatments to reduce stocking levels, improve stand vigor and growth, reduce crown fire and uncharacteristic fire risk, improve riparian habitat conservation areas (RMAs), or to plant early seral species such as, white pine, western larch and ponderosa pine. No action taken would not directly change structural stages or trend stages toward HRV conditions through commercial harvest, precommercial harvest, prescribed burning, and other actions in the short-term. Some trending may take place over the long-term due to tree mortality from stand density, disturbances such as fire, insects, and disease. However, this may also create unfavorable fuel loading conditions over time, potentially resulting in hazardous conditions for the WUI and firefighting efforts. Conversion of stands to shade tolerant species would continue (assuming little to no disturbance), also increasing the future hazard to insects, diseases and stand replacement fires. The probability of stand replacement by fire would continue or increase. Hardwoods would continue to be outcompeted by conifers and their abundance would decrease across the landscape.

Since no harvesting would take place, the economic value of the green, dead and dying trees would not be captured. Though the national forest does not necessarily plan treatments based on economic value, there would be no additional funding for other management activities. Typically, funding generated from timber

sales helps the local economy, aids in monitoring, stand improvement, wildlife, fisheries, recreation, and fuel reduction projects. No prescribed burning would be implemented to reduce hazardous fuels or create stand conditions resilient to fire occurrence.

Wildland Urban Interface (WUI) and Historical Infrastructure

Table 11. Acres of Defensible Zones within Wildland Urban Interface - Currently and Following Treatments

Resource Element	Resource Indicator	Measure	Existing Condition	Proposed Action
Wildland Urban Interface (WUI) and Historical Infrastructure	Defensible zones such as fuel breaks near structures and private property, strategic fuel treatments.	Acres treated within identified WUI	0 known acres of defensible space/ targeted WUI treatment identified	8000 acres of harvest and fuels treatment within CWPP designated WUI

Vegetation treatments throughout the identified WUI zones would contribute to long term (10+ years) reduction in uncharacteristic wildfire severity. As WUI continues to expand further into previously undeveloped areas, the previous, current, and future vegetation treatments result in the continued maintenance of these areas would become crucial to firefighting success over the next 20-30 years.

All proposed vegetation treatments within the identified WUI areas contribute positively to the resiliency and lessening of wildfire severity and the impact of wildfire on adjacent private property.

Air Quality

Although smoke from Hazardous Fuel and Commercial Harvest Activity Fuel burning may temporarily degrade air quality within the Ione analysis area and surrounding Pend Oreille River valley (where smoke tends to gather and accumulate), no reduction in measured Air Quality would result from these activities. Coordinated meteorological scheduling would be used to regulate all prescribed burns within the regional area, thus minimizing the potential for cumulative smoke impacts to the public. Prescribed burns would be scheduled and approved by the WA DNR only during periods of favorable atmospheric transport and dispersion. To ensure compliance with state and federal air quality standards, approved burning would be determined through monitoring and computer modeling of all scheduled and proposed emissions. This includes proposed burns from state, private and federal ownerships.

Vegetation management activities in this project will result in improved forest resilience to uncharacteristic wildfire within this project area. This would lead to a reduction in emissions if a large wildfire were to occur in the project area.

Firefighter and Public Safety

Table 12. Acres of Improved Engagement Zones for Firefighter and Public Safety Following Treatments

Resource Element	Resource Indicator	Measure	Proposed Action
Firefighter and Public Safety	Potential Fire Engagement Zones and Access	Fuels Reduction acres	8430 acres of improved engagement zones through vegetation treatment.

Increased firefighting access through the improvement and maintenance of forest system roads and more open stand conditions created by commercial harvest and prescribed burning will lead to improved long

term access (10 or more years). Previous and planned road maintenance in the project would allow for improved access by firefighting resources. Openings created through past USFS, DNR, private timber harvest, and underburning also may act as access routes for equipment including heavy machinery and aerial firefighting resources leading to more efficient suppression of wildfires. The additional acres in the Proposed Action would further increase access for firefighting resources.

3.3 Aquatics

The objective of the project is to improve watershed condition class by improving aquatic and riparian habitat conditions (e.g., support native aquatic and riparian dependent plant and animal species, distribution of conditions is similar to reference condition watersheds, hydrologic connectivity, and sediment regime is within the natural range of variation). This objective would be met on the two subwatersheds in the project area, as conditions would improve from functioning at risk to functioning properly after implementation of the project.

The two subwatersheds in the project area are Sweet Creek and Big Muddy Creek. Sweet Creek is a key subwatershed because of bull trout critical habitat. The key watersheds have been put in the Focused Restoration management area when other management areas don't take precedence such as backcountry. Big Muddy Creek subwatershed is not a key watershed, and is mostly in the General Restoration management area. The Forest Plan has separate road density desired conditions for the two subwatersheds, which are reflected in the WCF assessment.

3.3.1 Direct and Indirect Effects

The spatial boundary for direct and indirect effects on aquatic resources is Big Muddy Creek subwatershed and Sweet Creek subwatershed, as subwatersheds are the smallest feasible scale to evaluate watershed condition (USDA 2011), and the scale for applying the Watershed Condition Framework (WCF) assessment method to evaluate watershed condition per Forest Plan direction (USDA 2019). Direct effects occur at the time and place a proposed action is implemented. Indirect effects are reasonably foreseeable, and occur farther way or later in time in the short-term or long-term (less than five years or greater than five years, respectively).

The WCF is a systematic assessment method to score and rate subwatershed condition through the assessment of aquatic and terrestrial indicators. Scores from 1.0 to 1.6 are rated as functioning properly (good condition); scores from 1.7 to 2.2 are rated as functioning at risk (fair condition); and scores from 2.3 to 3.0 are rated as impaired function (poor condition). Table 13 presents WCF indicator and subwatershed scores and ratings following implementation of the proposed action, and indicates conditions in Big Muddy Creek and Sweet Creek subwatersheds would improve from functioning at risk to functioning properly, with Big Muddy Creek ratings improving from 2.0 to 1.5, and Sweet Creek ratings improving from 1.9 to 1.6. Conditions in these subwatersheds would improve primarily in response to aquatic habitat improvement work and aquatic organism passage barrier removal, and terrestrial road decommissioning and hydro-stabilization (to reduce road density), and improved road maintenance. The Aquatics report provides information on how each indicator is affected directly, indirectly and cumulatively.

Table 13. WCF Indicators Scores and Ratings for Existing Condition and Post Project Implementation

Subwatershed	Aquatic Physical Indicators*	Aquatic Biological Indicators*	Terrestrial Physical Indicators*	Terrestrial Biological Indicators*	Subwatershed Condition Score**	Subwatershed Condition Rating**
Big Muddy Creek Existing Condition	1.8	2.5	1.8	1.6	2	Functioning at Risk

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Subwatershed	Aquatic Physical Indicators*	Aquatic Biological Indicators*	Terrestrial Physical Indicators*	Terrestrial Biological Indicators*	Subwatershed Condition Score**	Subwatershed Condition Rating**
Big Muddy Creek Post Project	1.3	1.8	1.4	1.5	1.5	Functioning Properly
Sweet Creek^ Existing Condition	1.7	2.3	1.8	1.5	1.9	Functioning at Risk
Sweet Creek^ Post Project	1.3	2.2	1.4	1.4	1.6	Functioning Properly

*Average of indicator scores within each ecosystem process category.

**See USDA 2011 for weighted average score calculation. 1.0 - 1.6 = Functioning Properly (Good Condition); 1.7 - 2.2 = Functioning at Risk (Fair Condition); 2.3 - 3.0 = Impaired Function (Poor Condition).

^ Ratings for Sweet Creek subwatershed apply only to the portion of the subwatershed west of the Pend Oreille River.

Table 14. Summary of Effects Determination for Fish Species

Species	Status	Project Area Occurrence	Determination	Rationale for determination
Bull Trout	ESA Threatened	Yes	may affect, not likely to adversely affect	On the basis of the above evaluation, implementation of the proposed action and associated design criteria is Not Likely to Adversely Affect bull trout. The proposed project may impact individual bull trout, although this is not expected to occur due to the very low number of bull trout known to occur in Cedar Creek. Therefore, the Sweet-Ione Ecological Restoration Project would not contribute to a negative trend in viability on the listed bull trout.
Bull Trout Critical Habitat	ESA	Yes	may affect, not likely to adversely affect	Implementation of the proposed action and associated design criteria is Not Likely to Adversely Affect bull trout critical habitat. Potential short-term sediment inputs from watershed restoration projects is possible, but these projects would result in long-term Beneficial Effects for Critical Habitat in Cedar Creek. This project would not result in a negative trend in Bull Trout Critical Habitat.
Westslope cutthroat trout	Surrogate, Focal, MIS and Regional Forester Sensitive species	Yes	may impact individuals or habitat but is not likely to result in a trend toward federal listing	Implementation of the proposed action May impact individuals or habitat but is not likely to result in a trend toward federal listing, and continued viability is expected. The proposed action was found to be consistent with the applicable Forest-wide fisheries and watershed standards addressed in the Regulatory Framework section. The proposed action is not expected to hinder or retard the attainment of Washington State Water Quality standards or cause significant harm to native fish and their habitats in the long-term.
Redband trout	Surrogate, Focal, MIS	No	No impact	Not present, no impact.

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Species	Status	Project Area Occurrence	Determination	Rationale for determination
	and Regional Forester Sensitive species			
Pygmy whitefish	Sensitive	No	No impact	Not present, no impact.
Umatilla dace	Sensitive	No	No impact	Not present, no impact.
Lake chub	Sensitive	No	No impact	Not present, no impact

3.3.1.1 Bull Trout and Bull Trout Critical Habitat

The Sweet Creek subwatershed includes approximately 4.9 miles of designated critical habitat on Cedar Creek within the Clark Fork River CHU. The Sweet Creek subwatershed represents less than 0.1 percent of total critical habitat in the CHU. Within the designated critical habitat areas, the primary constituent elements (PCEs) 1-9 for bull trout are those habitat components that are essential for the primary biological needs of foraging, reproducing, rearing of young, dispersal genetic exchange, or sheltering.

The USFWS final rule identified nine PCEs essential for the conservation of bull trout. A matrix of diagnostics/pathways and indicators was created by USFWS to rate each PCE indicator as Functioning Appropriately, Functioning at Risk, or Functioning at Unacceptable Risk (USFWS 1998). All nine PCEs are found within the Sweet Creek subwatershed. The aquatics report details the existing condition and effects to the PCES.

In summary, based on the PCE effects analysis for this project, the proposed actions May Affect, but are Not Likely to Adversely Affect Bull Trout and May Affect, but are Not Likely to Adversely Affect designated Bull Trout Critical Habitat. While some effects on bull trout critical habitat are expected at the local level, no adverse effects are expected in the long term. The majority of the effects on PCEs would come from improvements to habitat and barrier removal.

There may be some short-term negative impacts in the Sweet Creek subwatershed from road construction and decommissioning activities, but there are long term benefits from large woody debris placement, riparian thinning, and barrier removal. The proposed action will improve baseline conditions in the drainage at specific locations over the long-term, though not to the extent to improve PCE ratings for critical habitat in the subwatershed as a whole.

3.4 Wildlife

The objective for wildlife is to improve habitat conditions (e.g., amount, distribution, and connectivity of habitat, forage availability, seclusion) for big game, surrogate species, and federally protected species. Moving the subwatersheds towards HRV and reducing stand replacing fire risk will improve wildlife habitat.

Deer and elk habitat will be improved through improving forage production and quality on summer and winter ranges.

Surrogate species analysis is in the Sweet Ione wildlife report.

Goshawk and white-headed woodpecker are management indicator species used to assess management activities. Closed canopy stands with large trees provide essential habitats for northern goshawks. The existing acreage of habitat in the Big Muddy Creek Watershed is within the range of habitat levels that would have existed historically. The project thins certain stands in this watershed to improve stand health and tree growth, while maintaining enough existing habitat to remain within historic levels. Open canopy stands with large trees provide essential habitats for white-headed woodpeckers. This habitat is well below historic levels in the Douglas fir-Dry Vegetation Type in both watersheds. The project promotes more of this habitat by thinning some dry site stands that presently have more closed canopies and an excess of trees per acre.

The Sweet-Ione Biological Assessment includes the effects analysis for ESA protected species. Federally listed terrestrial wildlife species in the analysis area include Canada lynx and grizzly bear with the monarch butterfly listed as a candidate species. The Proposed Action would maintain a mosaic of dense, young age class stands, and multi-storied stands on lynx range. Habitat connectivity would be maintained. The proposed action may affect, but is not likely to adversely affect lynx. The Sweet-Ione Project Area lies outside of the Selkirk Mountains Grizzly Bear Recovery Zone but within watersheds identified by the USDI Fish and Wildlife Service (2020) as places where “bears may be present.” The proposed action may affect, but is not likely to adversely affect grizzly bears. The project may adversely impact individual monarch butterflies or their habitat, but is not likely to result in jeopardy.

3.4.1 Species of Management Interest: Deer and Elk

3.4.1.1 Direct and Indirect Effects

Summer and Winter Range Cover and Forage - Timber harvest and fuels treatments would reduce surface fuels and continuous fuel ladders. Post-project, any wildfires that occur in the area would be more likely to burn cooler and would have fewer pathways to ascend into the overstory tree crowns. The risk of a hot crown fire removing forest cover over large areas would be reduced over the mid-term.

Timber stands in the early (young), and open canopy structural stages are presently well below historic levels in the subwatersheds. These stands typically provide the best growing conditions for the sun-loving forage plants utilized by big game. Timber harvest would create additional acres of these stands and move the subwatersheds closer to HRV for stand structural stages. Thus, the Proposed Action would be consistent with Forest Plan Guideline: *FW-DC-WL-13. Deer and Elk Habitat - Summer and Winter Range Cover and Forage* (page 60).

Table 15 displays the proposed vegetation treatments that could improve forage production and quality on big game ranges.

Table 15. Proposed treatments that have the potential to improve forage for deer and elk

Big game range	Acres of created openings (shelterwood + 60% of mixed harvest)	Acres of partial harvest (commercial thin + 40% of mixed harvest)	Acres under-burn within harvest units	Acres under-burn outside units
winter range (4,767 acres)	86 + 123 = 209	1,866 + 82 = 1,948	1,205	77
summer range ¹ (20,434 acres)	3,121	4,759	2,505	865

¹Summer range is the entire project area, since deer and elk are dispersed across the project area during the summer months.

Within openings created by timber harvest, existing browse and green forage plants could become markedly more palatable and productive, particularly where post-harvest burning occurs. In areas of

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partial harvest, existing forage plants should experience improved growth in direct relation to the amount of overhead tree canopy reduced.

The Forest Service would employ low-intensity, prescribed fires to reduce forest fuels both within and outside of harvest units. Within the treated areas, the above-ground portions of upland shrubs and grasses would be burned back. A “pulse” of nutrients would be released into the soil from the consumed vegetation, leaf litter, and dead wood. Existing forage plants on these sites should respond with profuse basal sprouting and regain most of their above-ground biomass in 1-2 growing seasons. The new growth on these plants should provide palatable and nutritious forage for some years following treatment. Thus, the Proposed Action would be consistent with Forest Plan Guideline *FW-GDL-WL-14. Mule Deer, White-tailed Deer, and Elk Forage* (page 66).

Noxious weeds could potentially colonize any soils exposed by logging equipment and prescribed fire. These plants may outcompete native forage plants for site resources. However, several factors would work to minimize the potential for noxious weed spread in the project area. Prescribed fires would be completed during optimum weather and fuel moisture conditions to ensure low-intensity fire behavior. Thus, most of the forest duff should be maintained in burned areas and very little soil should be exposed. New roads constructed with the project and selected open roads would be closed to the public. This would reduce the potential for noxious weeds to spread along road corridors. The project would incorporate routine mitigation to check the spread of noxious weeds such as seeding exposed soils at landings, skid trails and burn piles. Prior to the project, the Forest Service or a private contractor would use herbicides to treat weed infestations on roadsides and disturbed sites in the area.

Open Motorized Route Influence Zones - While the project is active, unauthorized motorized travel would be prohibited on all new temporary roads, un-drivable roads opened for the project, and existing restricted (gated) roads. Following their use for the project, new temporary roads and brushed-out roads would be effectively closed with native materials (e.g., earthen berms). Certain roads that are presently open would be closed to public use to increase seclusion for wildlife. Thus, the Proposed Action would move the project area towards the Forest Plan Desired Condition *FW-DC-WL-14. Deer and Elk Habitat - Human Activities* (page 60). Table 16 displays the existing and post-project acres within 0.25 mile of open motorized routes.

Table 16. Post-project acres influenced by open motorized routes on deer and elk ranges

Big game range	Current acres within open road influence zone	Proposed Action acres within open road influence zone	Forest Plan Desired Condition
winter range	3,379 (71%)	3,371 (71%)	<30% of the winter range
summer range ¹	15,934 (78%)	14,454 (71%)	<50% of the summer range

¹Summer range is the entire project area, since deer and elk are dispersed across the project area during the warm months.

Although the Proposed Action would increase seclusion habitat for wildlife from the current condition, while the percentage of big game ranges within the influence zone of open motorized routes would remain high, it is important to note that motorized travel on Forest Service roads is prohibited from December 1 to March 31 as shown on the CNF Motor Vehicle Use Maps. We have not documented unauthorized snowmobile use of these roads, likely because snowmobilers normally travel the designated snowmobile routes up into the higher elevations. We have occasionally documented unauthorized wheeled vehicle use of roads on the winter range when the snow depth is shallow.

Roadside Hiding Cover – Where feasible, patches or strips of vegetation that can provide concealing cover for elk would be retained within forest openings created along open roads, consistent with Forest Plan Guideline FW-GDL-WL-01. Hiding Cover for Wildlife (page 64).

Disturbance to Wintering Big Game - We have sometimes observed deer foraging on lichens and conifer needles in harvest units while winter logging is ongoing. Elk appear to be more prone to being disturbed and displaced by winter harvest activities. To reduce the potential for disturbance to big game, project activities would occur outside the wintering period over most of the mapped winter range area, consistent with Forest Plan Guideline FW-GDL-WL-13. Mule Deer, White-tailed Deer and Elk Habitat - Human Activities (page 66). Wintering animals should be able to displace to these secluded areas, if necessary.

3.4.1.2 Cumulative Effects – Proposed Action

The cumulative effects analysis area for big game habitat is the Big Muddy and Sweet Creek subwatersheds. No other vegetation management projects on NFS lands would be active concurrent with the Sweet-Ione project, and none are presently planned. Future projects would incorporate similar standard practices and design elements related to big game, as the Sweet-Ione project.

Timber harvest and prescribed burning proposed with the Sweet-Ione project would reduce conifer coverage and potentially increase the production and palatability of existing forage plants. These effects would complement the big game habitat improvements we have completed in the watersheds in recent decades such as: burning upland shrub fields to rejuvenate browse, removing encroaching conifers from meadows, and eradicating noxious weeds from roadsides, fields, and meadows.

Equipment operation required to complete the Sweet-Ione project could contribute to the spread of noxious weeds in the watersheds. These effects would be cumulative to those resulting from livestock grazing and forest recreation. To minimize this potential, the Forest Service would spray herbicides on roadside weeds prior to the project, seed soils exposed by equipment, close temporary roads, improve the effectiveness of existing road closures, etc. These actions are standard procedure for vegetation management projects on the forest. Active weed spraying programs will be necessary so long as forest management, grazing, and forest recreation continues.

State and private lands within the watersheds are unlikely to be managed with the needs of big game in mind. Managing to meet the HRV for vegetation is unlikely to be a consideration. Noxious weeds could increase on state and private timber lands over time, due to varying levels of commitment and resources available for prevention, treatment, and monitoring.

3.4.2 Northern Goshawk Nesting Habitat (Forest Plan Focal/Management Indicator Species)

3.4.2.1 Direct and Indirect Effects of No Action

Large (20+ inch) trees and late closed structural stage stands would be recruited in the project area according to natural processes. It is unlikely that over-stocked, stagnated stands of small diameter trees would ever produce significant numbers of large trees. Large trees growing in over-crowded stands would continue to become less able to fend off insect and disease attack, and drought stress.

Any future wildland fires that burn with lower intensity could improve habitat conditions for goshawks by clearing out dense stand understories and fostering the growth of understory plants that provide food resources (buds, green forage, seeds, berries) for many prey species. However, on-going fire suppression efforts would continue to trend the landscape towards a high-severity fire regime. Young trees would continue to in-fill forest stand understories. Fire-intolerant tree species would continue to colonize areas in which they were historically excluded by fire. Surface fuels would continue to accumulate. Fuel “ladders” from the stand understories into overstory tree crowns would continue to develop. These

incremental processes would tend to increase the risk of stand-replacing fires occurring in the area over time. Such fires could remove forest cover over large areas, including existing and potential nesting habitat for goshawks. Effective foraging habitat (forest mosaics with concealing cover) could be reduced on a landscape scale.

3.4.2.2 Direct and indirect Effects of the Proposed Action

Timber harvest, pre-commercial thinning, prescribed burning, and mechanical site preparation would all reduce ground fuels and continuous fuel ladders. These treatments would tend to slow the spread of fires that occur in the area and reduce the pathways for fire to ascend into the overstory tree crowns. Thus, the risk of high-intensity fires removing large acreages of suitable goshawk nesting habitat would be reduced.

Proposed forest management activities would be focused on reducing inter-tree competition and restoring historic tree species compositions. This should lead to more vigorously growing trees and increased stand resilience to drought and insect and disease attack.

Known Nesting Habitat - Within the Sweet-Ione Project Area, all mapped goshawk nest stands, suitable nest stands, and alternate nest stands would be reserved from harvest. This would equate to at least 180 acres of habitat left un-harvested around each known active nest. Moser and Garton (2009) found that goshawks re-occupied breeding areas in northern Idaho if more than 39 percent of the post-fledging area (164 acres) surrounding the nest contained potential nesting habitat following harvest. Some portion of approximately 120 acres of suitable and alternate nest stands mapped for the Picket Road nesting goshawk pair could be pre-commercially thinned. Trees up to 7 inches in size would be cut down, with the intention of reducing understory densities and fuel ladders and improving foraging conditions for goshawks.

It is possible a new goshawk nest could be found during future surveys, or by forest workers laying out harvest unit boundaries, marking, or cruising trees. In this event, we would map a nest stand and suitable or alternate stands, and manage them as directed by the Forest Plan.

Nest Disturbance - We would impose a timing restriction on project activities within 0.25 mile of active nests to ensure that nesting birds and their young are not disturbed, consistent with Forest Plan Standard FW-STD-WL-01. Nest Sites (page 62).

Potential Nesting Habitat – Because late closed associated species habitat is below historic levels in the Sweet Creek subwatershed, all those stands would be maintained (not harvested). Late closed species habitat is within HRV levels in the Big Muddy Creek subwatershed. The Proposed Action would thin approximately 126 acres of these mapped polygons. The intent of this harvest would be to increase the probability these stands would be maintained over the long term by:

- reducing inter-tree competition for site resources,
- increasing stand resilience to insects, diseases, and drought,
- restoring the historic tree species composition.

A minimum of 50 percent overhead canopy closure would be maintained within the thinned stands. However, the potential for the thinned stands to support nesting by goshawks would be reduced for 15-20 years, until growing tree crowns start to abrade once again. Thinning would concentrate growth on the largest, most vigorous appearing trees. A growing body of research has shown that thinning reduces the inter-tree competition for sunlight, water, and soil nutrients in the harvested stand (OR Dept. of Forestry 2008). Therefore, this harvest prescription can be used to accelerate the development of large diameter trees (Bailey and Tappeiner 1998, Dodson et al. 2012) that are preferred nest sites for large raptors.

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Table 17 compares the current condition and Proposed Action in relation to reproductive habitats for goshawks.

Table 17. Comparison of late-closed associated species habitat levels on NFS lands in the Sweet-Ione Project Area. All values are approximate.

Subwatershed	NFS acres	Historic range of late-closed habitat acres	Current habitat acres	Proposed Action habitat acres	Proposed Action habitat acres thinned
Sweet Creek	16,685	2,280 – 3,874	1,588	1,588	0
Big Muddy Creek	11,518	1,288 - 2,256	1,824	1,698	126

Within-stand Structures - Within all proposed harvest units, live trees that are 20+ inches in diameter would be retained (not cut) unless there is a clear silvicultural reason why the removal of smaller trees alone cannot achieve the desired conditions. All snags that are 10+ inches in diameter would be retained in harvest units to the extent feasible. Any trees with old raptor nest platforms would be retained. Up to 12 trees per acre that are 14+ inches in diameter and that have broken-tops, broom rusts, or mistletoe brooms, would be retained. Down logs would be retained consistent with Forest Plan Desired Condition FW-DC-VEG-01. Snags and Coarse Woody Debris (page 36). Thus, the great majority of the existing structures that goshawks typically select for nesting or prey preparation should still be available in the harvested units.

3.4.2.3 Cumulative Effects – Proposed Action

The cumulative effects area is the Big Muddy and Sweet Creek Watersheds. No other timber sales or other projects that could impact goshawk habitat on NFS lands would be active concurrent with the Sweet-Ione project, and none are being planned at this time.

The forest-wide assessments of species viability (Youkey 2012, Gaines et al. 2017) identified strategies to improve viability outcomes for goshawks across the Okanogan-Wenatchee and Colville National Forests. Table 18 lists the standard practices and design elements proposed for the Sweet-Ione project that would be consistent with these strategies. Any future timber sales on NFS lands in the watersheds would incorporate similar practices and elements. Timber sales on state and private lands may incorporate some of these practices but maintaining goshawk viability is unlikely to be a consideration on those ownerships.

Table 18. Sweet-Ione project standard practices and design elements consistent with conservation strategies to improve northern goshawk viability (Youkey 2012, Gaines et al. 2017).

Management issue	Sweet-Ione Proposed Action: Standard Practice / Design Element
reduction in source habitat	Maintain enough existing habitat to be within historic levels in each 6th field watershed. In those watersheds that are currently below historic levels, maintain all existing habitat. Promote additional habitat through commercial thinning and / or under-burning. Reduce forest fuels and restore fire to its historic function across the forest.
declines in the densities of large live trees and snags	Retain large (20+ inch DBH) live trees in harvest units to the extent feasible. Thin stands in middle structural stages to accelerate the development of large trees and increase patch sizes. Retain 10+ inch DBH snags and 14+ inch down logs in harvest units to the extent feasible. Initiate snag recruitment where necessary.

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Management issue	Sweet-Ione Proposed Action: Standard Practice / Design Element
potential loss of snags, down logs due to high road densities	Keep new roads, restricted access roads, and roads brushed out for the project, closed to public use. Close approximately 5 miles of currently open roads.
fire exclusion in dry forest types may have increased susceptibility to stand-replacing fires	Commercially thin forest stands in the Douglas fir Dry Vegetation Type to increase stand resiliency to wildfire, drought, and insect and disease attack. Use prescribed fire to reduce fuel accumulations and reintroduce fire to the landscape on up to 3,040 acres of harvest units and 895 acres outside harvest units (natural fuels units).

3.4.2.4 Effects Determination

If forest management were not initiated in the project area, potential habitats for goshawks would likely be maintained over at least the short-term. Additional large trees and late closed stands would slowly be recruited in the watersheds. The increasing risk of high intensity fires occurring in the area would not be addressed. Such fires could result in the wholesale loss of source habitats at a landscape scale.

With the Proposed Action, timber harvest and fuels reduction treatments would reduce forest fuels and fuel connectivity, decreasing the risk of high-intensity fire behavior.

The Proposed Action would not create gaps in source habitats that would tend to isolate populations of goshawks at the forest-wide scale. At the forest patch scale, the proposed action would maintain enough existing habitat to move the Big Muddy Creek and Sweet Creek Subwatersheds closer to their historic range of variability for stand structural stages. Scientists with the Interior Columbia Basin Ecosystem Management Project (ICBEMP) assumed that by managing forests to restore HRV conditions in each watershed, adequate habitat for native wildlife species would be provided in the basin because species survived within that range of habitat levels in the past (Wisdom et al. 2000).

At the within-stand scale, the great majority of individual large live trees, snags, and other structures used by these birds would be retained on site. Additional large tree habitat should be promoted over time through commercial thinning.

The Proposed Action would be consistent with all Forest Plan guidance related to active goshawk nests and mapped management areas (nest stands, suitable and alternate nest stands, and PFAs). Based on this discussion, we expect that the Proposed Action may affect individual goshawks but would not be likely to affect the continued viability of goshawk populations on the forest.

3.4.3 Canada Lynx Habitat

3.4.3.1 Direct and Indirect Effects of the Proposed Action

Shelterwood harvest (Unit 1) would create an opening on approximately 87 acres of the mapped lynx range. A mixed harvest prescription (Units 2 and 3) would occur on approximately 211 acres of lynx range; of which 60 percent of the acres harvested (127 acres) could be created openings. Commercial thinning (Unit 6) would occur on approximately 30 acres of lynx range.

Table 19 displays the short-term effects the Proposed Action would have to the mapped habitat components for lynx.

Table 19. Comparison of lynx habitat levels between the existing condition and the proposed action (all values are approximate)

Resource Indicator	Existing	Proposed Action
lynx prey habitat		
dense, young (15-30 years old) forest	276	276
multi-story forest	3,679	3,607
den habitat		
mature spruce / fir with ample overhead cover and large woody debris	1,342	1,342
unsuitable habitat	352	566
recently created openings that lynx would be reluctant to cross		

Den Habitat - No mapped potential lynx den stands would be harvested. Project related activities on the high-elevation lynx range should only occur late in the denning season, due to the cost of plowing snow and road use restrictions to protect soft roadbeds in the spring. In the unlikely event project activities occurred near an active den, a lynx mother should be able to relocate her young away from the area, if necessary.

Prey Habitat: Dense Young Forest - Vegetation management would not occur within older plantations on the lynx range that we mapped as potentially suitable habitat for snowshoe hares. Many of these plantations would likely grow out of suitable condition in about 10-15 years.

Timber harvest would create openings on up to 214 acres of the lynx range. These openings would be planted with trees, and we would expect some in-fill by trees that seed in naturally. Within about 20 years, growing young trees in these areas could become dense enough to provide good habitat for snowshoe hares.

Prey Habitat: Multi-story Stands – No live trees that are 20+ inches in diameter would be designated for harvest, except those that might exist within new road or equipment corridors, and landings. Because these mature trees tend to be the most prolific cone producers, they are important to red squirrels, an alternate lynx prey animal. Some discrete, multi-story patches of trees would be included within Units 2, 3 and 6. To the extent possible, these stand patches would be reserved from harvest as unmanaged “skips.”

Unsuitable Habitat - Timber harvest would create openings on up to 214 acres of stands in middle structural stages on the mapped lynx range. Lynx could be reluctant to cross these openings due to the lack of concealing cover; particularly in the winter (Interagency Lynx Biology Team 2013). These potential effects could last for 5-10 years, until growing conifers and other vegetation can re-establish hiding cover. In some locations, openings created by timber harvest would be broken up by patches of thinned trees, as well as unharvested “skips.” These islands of cover could be exploited by dispersing lynx. We would also leave intact cover patches on the major ridge that makes up the western boundary of Unit 1, to facilitate movement along the ridge (see Section 2.3, Project Design Elements).

Forest Roads and Trails – No new roads or motorized trails would be constructed on the mapped lynx range. The miles of open snowmobile routes on the lynx range would not change from the present condition.

3.4.3.2 *Cumulative Effects of the Proposed Action*

The cumulative effects area is the 36.5 square mile mapped secondary area for lynx, which runs from the U.S. - Canadian border to the northwest corner of the Sweet-Ione Project Area.

Timber sales associated with the Limestone Vegetation Management Project Environmental Assessment (USDA 2017) are presently active on NFS lands in northern half of the cumulative effects area. As with the Sweet-Ione project, the Limestone project would not affect any mapped potential den habitat. None of the sales would affect any older plantations on the lynx range that could be providing habitat for snowshoe hares. All sales would create openings in some stands in middle structural stages on the lynx range. These openings are likely to be avoided by lynx over the short term, until concealing cover is re-established by growing conifers and other vegetation. Within about 20 years, these sites could become dense enough to provide some higher quality snowshoe hare habitat. All projects would promote a mosaic of forest structure that includes dense, early successional stands, and a component of multi-story conifer stands, on the lynx range. Neither project would compromise habitat connectivity for lynx. There would be no change to open road densities or designated over-the-snow vehicle routes on the lynx range. No other vegetation management projects are active or proposed on NFS lands in the area.

The cumulative effects area includes approximately 622 acres of WA Department of Natural Resources (DNR) land east of Abercrombie Mountain. Since this parcel is entirely within the Abercrombie-Hooknose Roadless Area and has little commercial timber value, it will remain unmanaged. There are approximately 654 acres of private lands in the mapped lynx range. Some level of forest management has occurred on portions of these isolated parcels in the past. Plans for future vegetation management on these lands are unknown.

The noise of heavy equipment or motorized vehicle operation, and the presence of humans associated with the Sweet-Ione project could disturb resident or dispersing lynx. These effects could be cumulative to those disturbances resulting from the Limestone project, as well as forest recreation and the other activities characterized in Appendix B of the wildlife report. We expect these effects would be mostly limited to the summer months, and to local, discrete portions of the lynx range (e.g., active harvest units and open roads). Individual lynx should be able to easily displace from areas of on-going activity to other more secluded portions of the lynx range, if necessary.

3.4.4 *Grizzly Bear*

The Pend Oreille River Valley separates the project area from the Selkirk Mountains Grizzly Bear Recovery Zone. Although the project area is outside the recovery zone, it within watersheds classified by the USDI Fish and Wildlife Service (2020) as those where “bears may be present,” based on recent documented occurrences.

3.4.4.1 *Direct and Indirect Effects of No Action*

Forage Resources - Green forage plants would be available to bears for the foreseeable future within permanent openings such as homestead meadows and powerline corridors, as well as within wetlands and streamside riparian areas. In many cases, the ability of bears to make full use of these sites would continue to be impacted by the presence of nearby open roads. Openings recently created through timber harvest would also provide some foraging opportunities, until the canopies of young trees begin to abrade. Modest berry crops would continue to be available in the more open forest stands so long as adequate sunlight reaches the stand understories.

Ground and ladder fuels would continue to accumulate in the project area over time. The potential for a wildfire to ascend into the overstory trees and remove entire patches of forest would increase correspondingly. Upland shrubs, grasses, and forbs could be killed outright in the hottest portions of such

a fire. Where their root systems have not been overheated, these plants should respond with profuse sprouting of vigorous new shoots. A few years following a wildfire, there could be a dramatic increase in green forage production and palatability in the burned area. There would be a lag in fruit production until berry-producing shrubs can fully recover in perhaps 3-7 years (Coates and Haeussler 1986).

Burns of high intensity are the most likely to provide good growing conditions for noxious weeds. With high intensity fires there would be more overhead canopy removed resulting in higher light levels, and more forest duff consumed, exposing soils. There would be less living vegetation for newly established weeds to compete with for sunlight, water, and soil nutrients. In areas of heavy weed infestation, existing native plants could be replaced, including those that are palatable to bears.

Hiding Cover - Horizontal cover should remain abundant across the project area for at least the near-term. With increasing fuel loads, the potential for a large, hot fire to occur in the area would increase over time. In such an event, hiding cover would be removed in areas of high-intensity burns and degraded in mixed or low-severity burn areas. Bears moving through a large, recently burned area could be more vulnerable to human-caused disturbance or mortality, particularly near open roads.

Den Habitat - There would be no effects to potential den habitat since no new forest management activities would be initiated in the project area.

Seclusion - There would be no change in open or drivable route densities, or the availability of secure habitat in the project area, from the present condition.

3.4.4.2 Direct and Indirect Effects of the Proposed Action

Forage Resources – Proposed timber harvest would reduce the overhead tree canopy in many forest stands. Where they exist in the areas proposed for harvest, forage plants utilized by bears could benefit from the increase in available sunlight, and the reduction in competition for water and soil nutrients. Grasses and other green forage plants could quickly become more palatable and productive. Berry crops could be enhanced over time. These potential effects would likely be best realized where timber harvest creates openings. Shelterwood harvest would create approximately 1,240 acres of openings in the forest canopy. The mixed harvest prescription would create approximately 1,881 acres of openings.

The Proposed Action would employ low intensity burns to reduce forest fuel loads both within and outside of harvest units. Treated areas would either be mostly blackened, or a mosaic of burned and unburned sites, relative to the amount of surface fuels present (personal comm. with B. Zoodsma 2015). Prescribed fires would thin out dense areas of conifer regeneration and consume litter and down wood on the forest floor. The above-ground portions of forage plants eaten by bears could be consumed. However, a “pulse” of nutrients would be released into the soil from the ash of consumed vegetation and dead material. Green forage plants should quickly respond with profuse sprouting of nutritious and palatable shoots from their intact root systems. The quality and productivity of green forage plants should be improved for perhaps 5 - 10 years following burning. It would take perhaps 3-7 years for berry-producing shrubs to re-gain their pre-fire coverage (Coates and Haeussler 1986). Over the longer term, fruit production could be enhanced in burned areas.

Timber harvest and fuels treatments could expose soils and provide opportunities for the expansion of noxious weed infestations. New temporary roads and equipment corridors could provide pathways for the spread of noxious weed seeds. If weeds become locally established due to this project, they could out-compete existing bear forage plants, particularly native grass plants and forbs.

Several factors should minimize the potential for noxious weed populations to spread within the project area. Prescribed burns would be completed during optimum weather and fuel moisture conditions to ensure low-intensity fire behavior. Thus, most of the forest duff should be maintained and very little soil

should be exposed in burned areas. New roads would not be opened to the public. The project would incorporate routine weed control measures such as seeding exposed soils at log landings, skid trails and burn piles. Herbicides would be sprayed on roadside weed infestations prior to the start of the project. In addition, the Forest Service would continue to use herbicides to combat weed infestations in meadows, power line corridors, and other openings.

Hiding Cover - Hiding cover would be removed over the short term (approximately 5-10 years) within openings created by timber harvest. Where the opportunity exists, strips or clumps of trees and shrubs would be maintained along open roads located adjacent to created openings. The intent would be to limit line-of-sight distances from the road into the harvested unit. Within areas proposed for commercial thinning, hiding cover would be degraded in direct relation to the basal area of the residual trees, and the pre-harvest amount of understory plants.

Prescribed burning should have minor and mostly short-lived (1-3 years) impacts to hiding cover. Within areas proposed for under-burning there would likely be unburned “fire skips”, owing to discontinuous fuel concentrations at the stand level. Even in areas that are well-blackened, some degree of horizontal cover would be provided by the skeletons of shrubs and young trees, partially burned logs, and tree boles. Upland shrubs, grasses, and forbs would quickly re-sprout from their root systems and regain much of their above-ground biomass in one to a few growing seasons.

Potential Den Habitat – By far the best potential den habitat in the Sweet Creek and Big Muddy Creek Subwatersheds is along the major ridge systems of the Abercrombie-Hooknose Roadless Area, well-removed from the project area. Winter project activities would be unlikely to occur in the higher elevation units, due to the cost of plowing snow to those sites. Based on this, and the lower suitability of the project area for denning, the risk of disturbance to bears in an active den would be remote.

Seclusion - The level of human disturbance in the project area would increase for the duration of the project. Bears would likely avoid areas of ongoing activities; particularly where heavy equipment was operated. The normal timber sale operating season would begin on June 1 to protect soils and soft roadbeds. Thus, operations would be curtailed over most of the critical spring period for grizzly bears (April 1 - June 15). Project activities would occur during daylight hours and would be localized to a subset of active harvest units and timber haul routes at any given time. Bears should be able to disperse away from areas of ongoing activity, to more secluded locations if necessary.

With the Proposed Action, the timber sale purchaser would construct up to eight miles of new temporary roads to access timber stands for management. A few presently brushed-in roads could be made drivable. For the duration of the project, motorized travel by the public on these roads would be prohibited with gates or other means. Following harvest activities on a given road, the road entrance would be blocked with root wads, boulders, or excavated earthen berms. All or portions of the road prism might be ripped. Dependent on the need, we would seed any exposed soils with grasses and forbs and plant shrubs and trees on the road entrance to create a vegetative screen. Based on our experience with such native material road closures, we should be able to achieve a high degree of closure effectiveness.

Several existing roads in the project area would be decommissioned to reduce impacts to riparian habitats and water quality in streams. These roads were typically not built in the best location and are not needed for future forest management. Certain other existing roads would be closed to public use by means of gates installed on their entrances. All unauthorized roads would be closed using native materials.

Table 20 displays the approximate miles of motorized routes in the Sweet-Ione Project Area, before, during and after the project. Secure habitat acres are also displayed.

Table 20. Comparison of grizzly bear habitat indicators and measures (Project area = 31.9 square miles)

Resource Indicator	Measure (quantify if possible)	Existing condition	Proposed Action post-project
motorized access	Open route miles (density)	84 miles (2.63 mi / sq. mile)	71 miles (2.23 mi. / sq. mile)
	Drivable route miles (density)	109.9 miles (3.45 mi. / sq. mile)	96.9 miles (3.04 mi. / sq. mile)
secure habitat	Acres further than 500 meters from open and restricted roads	2,785 acres	3,937 acres

Post-project, the Forest Service would monitor closed roads in the area for five years. We would take any steps necessary to address breaches and improve the effectiveness of road closures.

3.4.4.3 Cumulative Effects of the Proposed Action

In grizzly bear recovery zones, biologists evaluate and monitor habitat over individual bear management units (BMUs). A BMU is roughly 100 square miles in size; the average area required to support an adult sow with cubs. The Sweet Creek - Pend Oreille River subwatershed (both sides of the Pend Oreille River) and the Big Muddy Creek subwatershed together total about 93 square miles. Thus, these subwatersheds are an adequate area over which to assess cumulative effects to grizzly bears.

No other timber sales are currently active or are planned on NFS lands in the cumulative effects area.

Cumulative Effects to Hiding Cover – Timber sales on all ownerships in the cumulative effects area would reduce hiding cover by removing trees and other vegetation. On NFS lands, hiding cover would be retained along open roads to the extent feasible, per Forest Plan Guideline FW-GDL-WL-01. Hiding Cover for Wildlife (page 64). Forest succession would restore hiding cover in most harvested areas within 5-10 years. The landscape across the timbered portions of the cumulative effects area would be a mosaic of stands in different age classes and structural stages and should remain permeable to dispersing bears. Over time, additional forest stands on private lands in the Pend Oreille River Valley could be converted to livestock and residential uses, reducing forest cover in the river corridor.

Cumulative Effects to Forage - Active or proposed forest management projects would cumulatively improve foraging opportunities for bears by removing conifer cover and stimulating the growth of understory plants. These benefits would be best realized in areas of regeneration harvest (created openings) that are subsequently broadcast burned. However, even partial harvests (e.g., thinning) can improve growing conditions for any green forage and berry-producing shrubs present in the harvested unit.

The Sweet-Ione project could contribute to the spread of noxious weeds where soil is exposed by heavy equipment operation. These potential effects could be cumulative to those resulting from timber harvest, livestock grazing, dispersed recreation, and other activities on all land ownerships. To minimize the potential for noxious weed spread, the Forest Service would continue to seed exposed soils, improve the effectiveness of road closures, spray infested road shoulders with herbicides, etc. These actions have been very effective in reducing weed spread in many parts of the Forest. Active weed spraying programs will be necessary so long as vegetation management, grazing, and forest recreation continues. Noxious weeds could increase on private and state lands over time, due to varying levels of commitment and resources available for prevention, treatment, and monitoring on those ownerships.

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Cumulative Effects to Seclusion – Disturbance effects from the Sweet-Ione Project Area could be cumulative to those attributed to any coincident forest management projects on other ownerships in the watersheds, as well as to the ongoing activities identified in Appendix B. However, disturbance resulting from the Sweet-Ione project would be limited to daylight hours during the normal operating season (June 1 - October 31). A small subset of the proposed harvest units and haul routes would likely be active at any given time. Road closures proposed with the project would result in a decrease in motorized route densities and an increase in secure habitat in the project area.

3.4.5 *Effects Summary: Threatened and Endangered (T&E) Species*

Table 21 provides a summary of the project effects determinations for threatened, endangered, and candidate species and the rationale for each determination. The expected duration of effects would be as follows: short-term = 0-10 years; mid-term = 10-30 years; long term = 30+ years.

Table 21. Summary of project effects to threatened, endangered, and candidate species

Species	Status	Determination	Rationale for determination
Canada lynx	T&E	<i>If No Action Occurs</i> may affect, not likely to adversely affect	Baseline habitat conditions likely maintained over at least the short term. With continued fire suppression, there would be an incremental increase in the risk of stand-replacing wildfires occurring in the project area over time. If such a fire overlapped the lynx range, it could create large swaths of unsuitable habitat and disrupt habitat connectivity over at least the short term. Natural forest succession in the burned area could set the stage for the eventual development of primary prey (snowshoe hare) habitat. However, the interiors of large burn scars could take long periods to reforest, owing to their distance from available seed sources. No change in road mileage or snowmobile routes on the lynx range.
Canada lynx		<i>Proposed Action</i> may affect, not likely to adversely affect	The Proposed Action would reduce the risk of future high-intensity fires occurring on the lynx range through stand stocking control (commercial thinning) and the reduction of forest fuels (prescription burning and mechanical site prep.). No known lynx den sites on the forest. Potential den stands mapped in the project area would be protected by avoidance. Timber harvest would create openings on approximately 214 acres of the lynx range. These areas would be avoided by lynx for 5-10 years, until growing trees and other vegetation can re-establish hiding cover. In 20+ years, young trees in these openings could grow sufficiently dense to provide suitable habitat conditions for snowshoe hares, indirectly benefitting lynx. Existing multi-story stand patches would be maintained in harvest units which overlap the lynx range. The Proposed Action would maintain a mosaic of dense young stand structure and multi-story stands on the lynx range. Habitat connectivity for lynx would be maintained. No change in road mileage or snowmobile routes on the lynx range. <i>Cumulative effects:</i> The cumulative effects area is the entire secondary lynx area centered around Abercrombie Mountain. Timber sales associated with the Limestone Environmental Assessment are presently active on NFS lands in this area. These sales would have similar and cumulative effects to lynx habitat as those reported for

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Species	Status	Determination	Rationale for determination
			the Sweet-Ione project. Potential den habitat would be maintained by avoidance. Multi-storied stands would be maintained. All projects would be consistent with recommendations in the Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013), as well as with Forest Plan Desired Condition <i>FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species</i> (page 59). No other vegetation projects are planned on NFS or state lands within the lynx range. Planned vegetation management on the small, isolated private parcels in the area is unknown.
grizzly bear		<i>If No Action Occurs</i> may affect, not likely to adversely affect	<p>Baseline habitat conditions likely maintained over at least the short term.</p> <p>Where future wildfires burn with low to moderate intensity, understory plants could experience improved light levels and decreased competition for site resources. The growth and palatability of green forage plants could be enhanced over at least the short term. Fruit production on berry-producing shrubs could increase. With continued fire suppression, there would be an incremental increase in forest fuels and fuel connectivity across the project area. The potential for stand-replacing fires to occur in the area would increase accordingly. Such fires could greatly improve the growth and palatability of forage plants, except where soil productivity is compromised in the most intensively burned areas. Stand-replacing fires could remove forest cover over large acreages, potentially making a grizzly bear moving through the burn scar more vulnerable to human-caused disturbance and mortality.</p> <p>Road densities and secure habitat levels would not change.</p>
grizzly bear		<i>Proposed Action</i> may affect, not likely to adversely affect	<p>The Sweet-Ione Project Area is outside of the Selkirk Mountains Grizzly Bear Recovery Zone but within watersheds where “bears may be present,” as identified by the U. S. Fish and Wildlife Service (USDI 2020).</p> <p>Proposed forest management would result in a widespread reduction in stand densities, surface fuels, and fuel continuity. The risk of a high-severity fire removing forested cover over large areas should be reduced. Timber harvest and under-burning would likely improve the production / palatability of existing forage plants over the short to mid-term. The extent of these effects would likely be most pronounced in created openings (e.g., shelterwood harvest units) that are subsequently underburned. Enough existing vegetation would be retained along open roads adjacent to created openings to maintain sight distances from the road into the unit, per Forest Plan Guideline <i>FW-GDL-WL-01. Hiding Cover for Wildlife</i> (page 64).</p> <p>Bears could be disturbed and displaced from areas of ongoing activities; particularly where heavy equipment is operated. These effects would be confined to a small subset of the proposed treatment units and access roads at any given time. New temporary roads, existing restricted roads, and roads brushed out for the project would be kept closed to public use. Post-project, drivable road densities would be reduced, and secure habitat would be increased by about 1,152 acres, due to proposed road closures. These actions would be consistent with Forest Plan Desired Condition <i>FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species</i> (page 59).</p>

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Species	Status	Determination	Rationale for determination
			<p><i>Cumulative effects:</i> The cumulative effects area is the Sweet Creek Pend Oreille River and Big Muddy Creek subwatersheds. No other timber sales would be concurrently active or are planned on NFS lands in this area. Timber sales on other ownerships would likely have similar beneficial effects to existing forage resources as the Sweet-Ione project.</p> <p>Concurrent timber sales on non-NFS lands and ongoing forest uses / activities identified in Appendix B could increase human disturbance in the cumulative effects area. However, disturbance resulting from the Sweet-Ione project would be confined in time and space and would be offset by the decrease in drivable road miles and increase in secure habitat that would be a direct result of road closures proposed with the Sweet-Ione project.</p>
monarch butterfly	C	<p><i>If No Action Occurs</i></p> <p>no affect</p>	<p>The Sweet-Ione Project Area is mostly forested, often with closed canopy stands. Flowering plants are not common in the area and tend to be most prevalent in the power transmission line corridors and on roadsides. Milkweed plants have not been documented in the area.</p> <p>Where future fires burn with low to moderate intensity, understory plants could have improved access to sunlight and decreased competition for site resources. The growth of flowering plants could be enhanced over at least the short term. With continued fire suppression, there would be incremental increases in forest fuels and fuel connectivity across the project area over time. The potential for stand-replacing fires to occur in the area would increase accordingly. Such fires could greatly improve the growth of flowering plants, except where soil productivity is impaired in the most intensively burned areas.</p>
monarch butterfly		<p><i>Proposed Action</i></p> <p>may adversely impact individuals or habitat, but is not likely to result in jeopardy</p>	<p>Adult and larval monarch butterflies could be directly killed by timber harvest, road construction, and prescribed burning operations. Animals could be more susceptible to predation in areas where concealing cover has been reduced. Nectar plants could be crushed by heavy equipment operation and removed where prescribed fire is employed.</p> <p>We have not documented milkweed plant species in the project area to date. Other nectar plants such as thistles, asters, sunflowers, and clovers appear to be very locally distributed within the powerline corridors, and on disturbed sites such as roadsides. These sun-loving plants are rare to nonexistent within most forest stands proposed for management, due to shading from the overhead tree canopies. Thus, the project area likely provides only marginal potential habitat for monarch butterflies.</p> <p>Wildfires, prescribed burning, or the combination of conifer removal and prescribed burning can increase the abundance of flowering herbaceous vegetation (The Xerces Society 2018). Thus, the project should improve the availability of nectar plant species used by monarch butterflies, at least to a modest degree.</p> <p>Cumulative Effects – On NFS lands in the Sweet Creek and Big Muddy Creek subwatersheds, no other timber sales or fuels treatment projects are planned or would be concurrently active with the Sweet-Ione project. The forest has an ongoing program of treating invasive weeds, including those plant species that are utilized by bees and other pollinators. It is our standard practice to control noxious weed infestations on roadsides prior to the start of a timber sale on NFS lands. Any herbicide applications on NFS lands in the Sweet-Ione Project Area would be</p>

Species	Status	Determination	Rationale for determination
			<p>targeted, limited in extent, and intended to replace noxious weeds with desirable native plants per Forest Plan Desired Condition <i>FW-DC-IS-01. Integrated Management for Invasive Species</i> (page 68). During routine maintenance of vegetation in the powerline corridors, the utilities normally leave plants less than 10 feet high untouched. Laval host plants and other plants that do not have a tall growth form are not targeted with herbicides. Herbicide application in the corridors is selectively applied to individual plants or small groupings of brush using a backpack or ATV mounted sprayer (Jahn 2020).</p> <p>Livestock grazing and summer recreation in the project area have the potential to cumulatively impact food plants and low cover for butterflies (see Appendix B). However, these potential effects should be mitigated by the promotion of flowering plants where they exist in treatment units.</p>

3.5 Economics

Project objective 5 is to support local jobs and labor income within the counties surrounding the forest through a predictable and sustained flow of timber and forest products within the capability of the ecosystem. Timber harvest activities can reasonably be expected to result in economic benefits for rural communities. Estimates of direct and indirect jobs per year created from one million board foot (MMBF) of timber harvested in Washington State range from 7.7 to 13.2 direct jobs per MMBF per year and 32.3 to 36.82 indirect jobs per MMBF per year (Mason 2005), (Lippke and Mason 2005).

The proposed action for this project would provide economic benefit to the local economy through the harvest of approximately 59 MMBF of timber. Local mills rely partially on wood products supplied by National Forest Lands, and the proposed timber harvest would help sustain jobs by providing material to keep the mills operating. Secondary economic benefits will be created from preparation, implementation and administration of logging, thinning, road work, habitat restoration, reforestation, and fuels reduction activities. A wide variety of skills and equipment would be required to complete the various treatments.

3.6 Transportation

Project objective 6 is to provide a system of safe and sustainable authorized roads and bridges that provides public and administrative access where suitable and supports forest management objectives. The Interdisciplinary team reviewed the road system and weighed the needs for natural resource and access. The following access needs were considered by the interdisciplinary team:

- We must provide reasonable (i.e., road) access to private in-holdings per the Alaskan Native Interest Lands Conservation Act.
- The Bonneville Power Administration and Pend Oreille County Public Utility District #1 require road access to service power transmission line infrastructure and maintain power line corridors.
- The US Air Force Survival School desires continued open road access on specific roads.
- Open road access is provided for forest recreation, special forest products collection (ex., firewood), and range allotment permit administration.

The natural resource needs are described in the resource reports. These included:

- Moving towards Forest Plan desired conditions to reduce open road density in the subwatersheds. (MA-DC-FR-05, MA-DC-GR-05)
- Providing for wildlife seclusion (MA-DC-FR-02)
- Reducing roads that pose a risk to aquatic and riparian conditions (FW-STD-WR-05)

The proposed action includes consideration of comments and participation of the public during the scoping process with several roads remaining open due to that process. The Forest Service road system in the proposed action provides public and administrative access while reducing effects on natural resources as detailed in the specialist reports.

3.7 Botany

3.7.1 Direct and Indirect Effects

The analysis area/spatial effects boundary for direct and indirect effects on sensitive plants includes the footprint of activity area disturbances (harvest and burn units, road construction, and restoration activities). Because roads are represented as line features, the road construction areas are buffered 100 feet to account for the area that could be disturbed.

If no action is taken, sensitive plant populations and habitats would remain undisturbed except in the case of wildlife and natural events (fire, flooding, hail and severe wind) or climate change impacts. The risk of direct impacts to known or undiscovered sensitive plant populations as a result of project activity would be eliminated.

Numerous forb and graminoid plant species occur in the analysis area, this includes traditional-use plants that are culturally important for the Tribes. In densely-stocked stands, understory vegetation species diversity and plant composition could be diminished because dense tree canopies and sub-canopies inhibit available sunlight from reaching the forest floor. This condition reduces ecosystem productivity and resilience by limiting biomass production, soil fertility, post-fire vegetation recovery, and availability of food for wildlife species. Under the proposed action, thinning and prescribed fire treatments would benefit the understory vegetation (including tradition-use plants) by increasing plant vigor and diversity as these treatments would open the tree canopy, allowing more light to get to the ground and less competition for soil resources such as water. Understory vegetation would grow, with increased diversity of forb and graminoid species. Design elements and Standard Practices would help reduce impacts traditional plants.

The spread of noxious weeds has potential for adverse impacts on sensitive plant populations and habitats. Although no new vegetation disturbance would occur with this effect, existing weed populations would continue to exist and potentially expand. Even with continued weed control treatments, existing weed infestations would likely expand, especially in undocumented, inaccessible sites.

3.7.2 Cumulative Effects

Temporal effects in the short term will range from implementation to five to eight years depending on the implementation schedule for the actions. After this time most short-term effects would be diminished. Long-term effects may be apparent ten or more years after implementation. While effects from proposed activities may still be apparent 50 or more years, predicting effects beyond 50 years for botanical resources becomes too speculative for reliable analysis.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Past activities within the project area have led to habitat modification and fragmentation in and around the project area. Past activities or events that have affected the amount or suitability of sensitive plant habitats

include road construction, road maintenance, timber harvest, grazing, herbicide treatment, vehicular traffic, recreational uses, and wildfires. Activities with ground disturbance such as road construction/maintenance and traffic, fires, range, and wildlife contribute to the cumulative increase of invasive plants. These activities may have resulted in areas becoming unsuitable for sensitive plants by removing the tree canopy or individual plants may have been directly impacted. The effects from these disturbances may have reduced the number of sensitive plant occurrences or suitable habitats within the project area. Similar to the current proposal, past activities have included design features to help protect against impacts on sensitive plants.

Current ongoing and reasonably foreseeable activities include use by Air Force for training purposes, herbicide spraying for noxious weeds, road maintenance and construction, public firewood gathering, public use of motorized vehicles, and other recreational activities such as dispersed camping, berry-picking, hunting, and hiking. These activities could result in direct damage to sensitive plants, indirect effects to sensitive plant habitats, and new disturbed sites available for colonization by weeds. No specific future activities needing further NEPA analysis are foreseeable in the project area at this time.

When the effects of past, present, and reasonably foreseeable activities are combined with the anticipated effects from the proposed activities, sensitive plants may be impacted, but their viability in the planning area is expected to be maintained due to unaffected habitat and occurrences remaining inside the project area and additional occurrences being present on the Forest.

3.8 Recreation

3.8.1 Spatial and Temporal Context for Effects Analysis

The spatial boundaries for analyzing the effects to recreation resources is the Sweet-Ione project area. Outside of this area, the effects to recreation opportunities become stable as opportunities for dispersed recreation, trail use, and access to inventoried roadless areas become readily available. An exception to this is the potential for cumulative effects to snowmobiling on the Mill Creek System.

The temporal boundaries for analyzing the effects (direct, indirect, and cumulative) to recreation resources are 5-10 years which allows five years (standard timber sale contract period) to implement all planned vegetation harvest work with an additional five years to implement prescribed burning activities which frequently require additional time to meet approved burning windows so resource objectives can be met. However, the timeline associated with the immediate effects of harvesting or burning within specific units on recreation resources are generally short-term (less than 1 year).

3.8.2 Direct and Indirect Effects

Potential effects include winter operations of plowing snow, hauling timber, and moving equipment on groomed snowmobile routes within the project area which could reduce the number of miles available to the public for use during winter. Table 22 shows the miles of groomed and ungroomed snowmobile routes that may be affected during winter harvest activities. If the action does not occur, there would be no effect to snowmobile use within the project area.

Roads open to all vehicles would increase by 1.5 miles providing increased riding opportunities to OHV users. If the action is not taken, OHV users would still have access to 21 miles of roads within the project area. However, roads open to highway legal vehicles only would decrease by approximately 5 miles under the proposed action. If this action occurs, it could affect where people camp, the amount of driving on forest roads for pleasure, access to forest by-products, and may result in additional vehicles on the remaining open roads. While project activities would increase dust, noise, smoke, congestion from commercial traffic, temporary loss of access to favorite hunting, fishing, berry picking areas, and possibly road closures, overall, improvements to these roads should enhance vehicle access into the project area

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and improve the recreational experience. If the action does not occur, roads are likely to continue to deteriorate and, in some cases, fail resulting to a reduction of road miles available to highway legal vehicles, at least until those roads can be repaired. Only slight changes in OHV use patterns, opportunities or experiences are expected from the proposed level of road decommissioning associated with routes currently open to motor vehicles.

A total of 8.0 miles of user-created OHV roads/trails would be obliterated with the Proposed Action. With this action, existing levels of illegal OHV cross-country travel and closed road use would likely be reduced within the project area. Illegal OHV use may actually increase in units if management activities open up the stands adjacent to Forest System roads or if temporary roads and skid trails are not effectively closed. To minimize this potential effect, vegetative screening would be left along roadways and temporary roads and skid trails would be effectively closed with native materials. Signage and education may contribute to a reduction in unauthorized OHV travel.

Table 22. Resource Indicator and Measures for Proposed Action

Resource Indicator	Measure	Existing Condition	Proposed Action	Effect
Designated groomed snowmobile routes	Miles of groomed routes	4 miles	4 miles	Some routes may be closed during winter harvest operations. This would be limited by applying design elements that limit the area of winter harvest to ensure some groomed routes remain accessible to snowmobile use. If the action is not taken there would be no change in accessibility to snowmobile routes.
Designated ungroomed snowmobile routes	Miles of ungroomed routes	18 miles	18 miles	Ungroomed routes would be affected during winter operations occurring where ungroomed routes occur. If the action is not taken there would be no change in accessibility to snowmobile routes.
Roads open to all vehicles	Miles open to all vehicles	21	22.5	The project would increase the amount of routes open to all vehicles (this includes OHVs). If the action is not taken roads open to all vehicles would not increase.
Roads open to highway vehicles only	Miles open only to highway legal vehicles	52 miles	47 miles	Reduces routes open to highway vehicles only by 5.0 miles. If the action is not taken roads open to highway legal vehicles would not be reduced.

3.8.2.1 Winter Recreation

Designated groomed snowmobile routes within the project area could be adversely affected by winter harvest activities. Plowing snow, hauling timber and moving equipment on NFS lands along groomed snowmobile routes within and outside the project area could reduce the number of miles available to the public by reducing the viability of the routes.

The majority of winter recreation use is snowmobiling on designated groomed routes. The grooming program is managed in cooperation with Washington State Parks and local snowmobile club grooming councils. Winter harvesting and hauling on these routes would reduce the quality and availability of

winter recreation experiences in those areas, thus impacting the program. Short and long-term adverse impacts from harvesting operations occurring during the winter months on a continual basis would result in reduced funding for the grooming program. Closure of snowmobile routes year after year could potentially eliminate funding opportunities for grooming these trails in the future.

To address this issue, winter operations on NFS lands that would require plowing, hauling, or moving equipment on designated groomed snowmobile routes would be prohibited from December 1 to March 31.

Winter operations would only be allowed on designated ungroomed routes if approved by the district recreation specialist and district ranger. Press releases, signing, traffic control measures and other mitigation measures would be required prior to use of these routes.

3.8.2.2 *Camping*

Access to existing dispersed campsites within timber harvest units would be lost while each unit is actively being harvested or burned. Since not all units would be actively worked at the same time some dispersed campsites should be available within the project area throughout the implementation phase of the project. In addition, there are other suitable locations available in the project area that have never been used for dispersed camping in the past. If existing campsites are unavailable, the potential exists for new sites to be created and used, ensuring the opportunity for dispersed camping would be retained throughout implementation of the project.

Removal of vegetation surrounding dispersed campsites, either through harvest or burning, may lead to a long-term loss of vegetative screening between the campsites and their access roads. Dispersed campsites located near active management units may be impacted by noise, dust, smoke, and road congestion from additional commercial traffic, temporarily reducing the quality of the camping experience at those campsites. Dispersed campsites may also be impacted for several years if used as landing sites. These impacts could include soil compaction, loss of ground vegetation, expansion of the site, scarring of surrounding trees, loss of shade, slash accumulation, and scarring from pile burning. Upon completion of harvest and burning activities, the availability of sites suitable for camping should increase within the project area as a result of openings created through thinning, ladder fuel reduction, and new landings.

Work within or adjacent to dispersed camping sites during the primary recreation and hunting season (Memorial Day through November) could impact users through congestion, commercial vehicle traffic, noise, dust, and smoke. In most cases, terrain features and existing vegetation surrounding campsites would reduce these impacts. Safety concerns associated with increased traffic would likely be mitigated with standard signing used for harvest and log haul traffic activities.

Where vegetation management occurs, we would attempt to maintain adequate shade and screening at high-value dispersed sites. The intent would be to maintain the long-term health and sustainability of vegetation within the immediate foreground zone (0 - 300 feet) of high-value dispersed campsites identified and mapped by the district recreation specialist.

The use of dispersed campsites as landings would be pre-approved by the district recreation specialist. After harvest and fuel treatments are complete, cleanup of any dispersed campsites located within the harvest units would be performed. Slash from the campsite core (fire ring, parking area, tent area) would be removed, and soils disturbed by equipment operation would be leveled.

3.8.2.3 *Road Access*

The proposed action would construct 8 miles of temporary roads all of which would be closed to unauthorized use at all times. Under this alternative 3.5 miles of existing open roads would be closed to public use. The number of miles of road to be decommissioned is 9.0 miles. Net change of open existing

roads within the project area is a decrease of 5.0 miles. These roads were listed on the MVUM. However, the road prism was overgrown with thick vegetation and the roads have not been drivable for many years. The existing road systems scheduled for decommissioning are segments which are either being moved out of riparian habitat conservation areas, not necessary for future forest management and are potential sources of sediment to streams. Approximately 1.5 miles of roads open to full sized vehicles only would be opened to all vehicles including OHVs. Only slight changes in OHV use patterns, opportunities or experiences are expected from the proposed level of road decommissioning associated with routes currently open to motor vehicles.

A total of 8.0 miles of user-created OHV roads/trails would be obliterated with the Proposed Action. With this action, existing levels of illegal OHV cross-country travel and closed road use would likely be reduced within the project area. Illegal OHV use may actually increase in units if management activities open up the stands adjacent to Forest System roads or if temporary roads and skid trails are not effectively closed. To minimize this potential effect, vegetative screening would be left along roadways and temporary roads and skid trails would be effectively closed with native materials. While closure devices and management signing have been successful in reducing the volume of illegal use, these actions are based primarily on enforcement and engineering. Additional management tools based on education and providing quality riding experiences within the project area may also help reduce existing and future levels of illegal OHV use.

Dispersed recreation opportunities (i.e., berry picking, hunting, driving for pleasure, mountain biking, OHV riding, geocaching, etc.) which are dependent upon motorized access should mostly see short term effects limited to the immediate area where harvest and burn activities are proposed. Short-term impacts would include dust, noise, smoke, congestion from additional commercial traffic, temporary loss of access to favorite hunting, fishing, and berry picking areas, and possibly road closures. Overall, improvements to these roads should enhance vehicle access into the project area for these numerous types of dispersed recreation, improving the recreational experience within the project area

3.8.2.4 Backcountry / Inventoried Roadless Area

There would be no reduction in the number of acres suitable for designation as an Inventoried Roadless Area under the 2001 Roadless Area Conservation Rule since the affected IRA, Abercrombie-Hooknose, would not contain any new roads or commercial harvest treatments. Unit boundaries adjacent to this management area would be accurately located with a GPS unit to ensure the integrity of the management area.

3.8.3 Cumulative Effects

There are no presently active or other planned timber sales on NFS lands in the project area. We anticipate no cumulative effects to dispersed camping and road access from other projects and activities.

3.8.4 Winter Recreation

Winter recreation opportunities may be affected by the implementation of other timber sales located adjacent to the project area or in the vicinity. Implementation of other projects could overlap with the Sweet-Ione project. Project overlap is based on the assumption of a five year implementation schedule for other projects.

Implementation of the Sweet-Ione project and other active or proposed timber sales could cumulatively impact snowmobiling on the Mill Creek and Flodelle/Tacoma designated groomed snowmobile trail systems. Closures for public safety due to winter logging operations may reduce the number of designated groomed and undesignated groomed snowmobile opportunities which could displace use in the Sweet-Ione project area and adjacent areas. Additional use may lead to the perception of crowding and a

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decrease in user satisfaction with the winter recreation opportunities associated within the Sweet-Ione project area and adjacent areas.

Winter use, particularly over-the-snow vehicle use, would be the most impacted by the cumulative effects of this project and any other adjacent project(s). Both Sweet-Ione and NFS lands to the west of the project area have designated groomed snowmobile routes which could be proposed for use as winter log haul routes. If route closures occur in both areas at the same time, users may not have adequate alternatives for riding.

Prohibiting plowing, hauling and moving equipment on NFS lands adjacent to designated groomed snowmobile routes from December 1 through March 31 would result in no cumulative effects.

3.9 Soil

3.9.1 Direct and Indirect Effects

Table 23. Resource indicators and measures for Proposed Action – direct and indirect effects

Resource Element	Resource Indicator	Measure	Proposed Action Direct and Indirect Effects
Soil Function	Detrimental Soil Conditions	Extent in Activity Areas	1000 Acres
Soil Erosion	Surface Soil Erosion and Landslide Potential	Potential for Detrimental Surface Soil Erosion and Detrimental Mass Soil Movement	Moderate (short-term 0 to 5 years) Low (long-term 5 to 50 years) with recovery of soil cover.
Soil Organic Matter	Depth of Forest Floor, Quantity of Fine and Coarse Wood	Potential for Soil Fertility and Soil Function Issues Due to Lack of Organic Matter Inputs	Low
Watershed Function	Area of Proposed for Disturbance of Hydrologic Function – New System and Temporary Road Construction	Acres of Additional Temporary Road minus Areas of Hydrologic Function Restoration (Road Decommissioning)	-70 Acres <i>There is a net positive benefit to watershed function of 70 acres.</i>

3.9.2 Cumulative Effects

Table 24. Resource indicators and measures for Proposed Action – cumulative effects

Resource Element	Resource Indicator	Measure	Proposed Action Cumulative Effects
Soil Function	Detrimental Soil Conditions	Extent in Activity Areas	No Cumulative Effects
Soil Erosion	Surface Soil Erosion and Landslide Potential	Potential for Detrimental Surface Soil Erosion and Detrimental Mass Soil Movement	Low – (No Change)
Soil Organic Matter	Depth of Forest Floor,	Potential for Soil Fertility	Low – (No Change)

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Resource Element	Resource Indicator	Measure	Proposed Action Cumulative Effects
	Quantity of Fine and Coarse Wood	and Soil Function Issues Due to Lack of Organic Matter Inputs	
Watershed Function	Area of Proposed for Disturbance of Hydrologic Function	Acres of Additional System and Temporary Road minus Areas of Hydrologic Function Restoration (Road Decommissioning)	Not Applicable

There are no other activities in the reasonably foreseeable future (defined for this analysis as projects decided and waiting for implement, in any stage of planning, or listed on the out-year plan, or listed in the Schedule of Proposed Actions on the Colville National Forest website) that are expected to substantially increase the detrimental soil condition in the project area. There is no overlap in time and space. Effects are described in the direct and direct effects in the previous sections.

There are no quantifiable cumulative effects as a result of the proposed action in terms of Soil Function, Soil Erosion, and Soil Organic Matter resource elements. This is due to the bounding of the analysis on the activity area.

There are cumulative effects for Watershed Function resource element using the resource indicator of “Area proposed for Disturbance of Hydrologic Function” due to the definition of the resource indicator. In general, the addition of temporary roads to the Big Muddy Creek and Sweet-Pend Oreille River subwatersheds in combination with the existing road system and the road features that are proposed for decommissioning will lower watershed function for the short term. In the long term, watershed function will return to current condition or improve in condition.

3.10 Range

The Tiger Hill grazing allotment is the only active grazing allotment located within the Sweet-Ione project. Approximately 43% or 9,562 acres of the allotment lie within the current boundary of the project proposal. The Tiger Hill allotment is 22,200 acres total and is classified as a Cattle and Horse allotment. Addressing forest health issues through vegetation management and fuels reduction would likely produce positive outcomes in the amount and abundance of understory vegetation, which permitted livestock and wildlife use as forage. Griffis et al. (2001) found that the abundance of native grass production increased substantially with treatment intensity through thinned timber stands that also had prescribed fire to reduce surface fuels. Design elements would serve to keep livestock within the allotment. If no action takes place, forage may continue to decrease overtime but would not likely result in a reduction of animal unit months.

3.11 Air Force

Vegetation management is needed to return the balance to training locations used for decades by the survival school. The school has a substantial need for vegetation management, especially commercial timber harvesting and smart commercial thinning. As small diameter trees and dead wood are consumed by the survival school during the course of training; the trees left behind grow larger, eventually producing a “park-like” forest area with very little undergrowth. This creates a forest dominated by large trees and eventually training would cease to exist in these areas as they would be void of any usable material to conduct training. There are many areas within the project where this is the case and would require timber harvests which would require years of regrowth before they become useful again. Commercial timber harvests mainly consist of clearing out marketable timber, masticating remaining

material, and then burning the left-over debris before replanting. In the units where this type of vegetation management occurs, the area is virtually unusable for training for a considerable amount of time. The area where treatments like commercial timber harvest occur would only be seen after the area has had a chance to regenerate. It would then be ripe with materials the survival school requires to conduct training for many years.

The direct effect of the proposed action would be negative for the short term only. Normally when commercial harvest, pre-commercial thinning, and fuels treatment is scheduled to occur, the Survival School would relocate for safety. The increased traffic associated with commercial harvest activities and the traffic from prescribed burn equipment creates a safety concern. The smoke and potential fire spread in the vicinity of a prescribed burn could cause students on navigation routes to become disoriented and potentially walk into the burn area. In all, the general increased activity associated with a vegetation project is a safety concern for the school. The displacement can last from a few days to a few years depending on the prescription and length of time needed to achieve the desired objective.

The indirect effect and benefit of the proposed action would come after treatments and regrowth. The units within the project area that aren't conducive to a select cut prescription would be usable after they have a chance to regenerate and compete enough to produce dead standing wood.

The cumulative effect is after a period of time (5-10 years) the area would regrow and provide ample vegetation for the survival school to conduct survival training.

3.12 Environmental Justice

This section is based on information from the U.S. Census and from IDT member input. No adverse effects to consumers or civil rights were identified through the effects analysis. The proposed action was assessed to determine if it would disproportionately impact minority or low-income residents of Pend Oreille County in accordance with Executive Order 12898. From 2015-2019 approximately 13 percent of individuals and 8 percent of families in Pend Oreille County were living below the poverty line (U.S. Department of Commerce 2020). Low-income residents use the Colville National Forest to gather forest products, hunt, and fish. There is no evidence that low-income people use the project area disproportionately when compared to other people. Further, the proposed action maintains access for these activities. Minority communities or low-income people would not be disproportionately affected.

4.0 Agencies or Persons Consulted

The opportunity for public participation in the analysis of this project was initiated through a pre-scoping field trip on August 2, 2018. A scoping letter was then sent to the public, including adjacent landowners, Federal, State, and local agencies, Tribes, Northeast Washington Forestry Coalition, and other non-Forest Service persons and interested parties on June 27, 2019. Public collaboration meetings at the Kalispel Tribe's Camas Wellness Center and the Ione Community Center were held on May 29, 2019. The Colville National Forest's Schedule of Proposed Actions was first published August 8, 2018.

The Forest Service consulted the following individuals, Federal, State, tribal, and local agencies during the development of this environmental assessment:

4.1 Federal, State, and Local Agencies

The U.S Fish and Wildlife Service, the U.S. Air Force, Washington State Department of Natural Resources, Washington Department of Fish and Wildlife, and Pend Oreille County Board of Commissioners.

4.2 Tribes

Consultation letters were mailed to the Kalispel Tribe of Indians, the Confederated Tribes of the Colville Reservation (CCT), and the Spokane Tribe of Indians on November 21, 2018.

The CCT responded and are concerned about the potential for the area to contain Pre-Contact sites (e.g., rock features) and culturally modified trees. The high potential to contain Traditional Cultural Properties (TCP) and a recommendation to undertake a formal TCP study, and consideration of significant populations of traditional cultural plants (e.g., huckleberry, camas, and bitterroot). They also encouraged the use of restoration activities that would positively benefit these same plant populations. We also received a response from the Spokane Tribe disclosing no concerns as the Area of Potential Effect is within the Kalispell Tribe area. However, they requested notification if artifacts or human remains were discovered during earthmoving activities.

In addition, consultation is on-going with tribes as the Forest Service works with them to learn specific future condition expectations, enhancement techniques for species of concern, and a list of the most important plants they would like the Forest Service to track.

4.3 Others

The Forest Service provided information on this project to over 100 individual entities (identified on the project mailing list located in the project record). This list includes recreation, environmental, industrial groups and individuals, and other interested parties.